ELECTRICAL REVIEW

and WESTERN ELECTRICIAN with which is consolidated ELECTROCRAFT

Vol. LXIV, No. 23. CHICAGO, SATURDAY, JUNE 6, 1914. ISSUED WEEKLY.

COMPRISING

ELECTRICAL REVIEW WESTERN ELECTRICIAN ELECTROCRAFT

ELECTRICAL REVIEW PUBLISHING COMPANY, INC.
608 SOUTH DEARBORN STREET
CHICAGO

Charles W. Price, President and Treasurer.
A. A. Gray, General Manager. H. S. Tuthill, Business Manager.
C. W. Forbrich, Assistant Business Manager.

E. E. Wood . . . . . 13 Park Row, New York, N. Y.
Manager Eastern States.
J. R. McCarthy . . . . . Detroit, Mich.
Manager Middle States.
C. W. Forbrich . . . . . Chicago, Ill.
Manager Western States.

ELECTRICAL REVIEW AND WESTERN ELECTRICIAN

Charles W. Price.....Editor-in-Chief
A. A. Gray.....Managing Editor
Morton Githens Lloyd.....Technical Editor
F. H. Bernhard.....Associate Editor
Howard Ehrlich.....Associate Editor
Chester A. Gauss.....Assistant Editor

MEMBER SERVICE THE SOCIETY FOR ELECTRICAL DEVELOPMENT INC. NEW YORK SAFETY DO IT ELECTRICALLY

SUBSCRIPTIONS.

One Year, United States.....$3.00
One Year, Canada.....4.00
One Year, Foreign Countries.....6.00
Single Copy, 10 cents. Back one month, each..25

Entered as second-class matter, November 7, 1908, at the Post Office at Chicago, Ill., under the Act of March 3, 1879

CONTENTS.

EDITORIALS:
The Thirty-seventh Annual Convention of the National Electric Light Association.....1117
Street and Highway Lighting.....1118
Forms for Electric Rate Schedules.....1118
The Indeterminate Permit.....1118
Side Lights on Electric Automobile Touring.....1119
DEPARTMENTS:
Electrical Construction.....1145
National Association of Electrical Inspectors.....1149
Public Service Commissions.....1151
Legal Notes.....1152
New Electrical and Mechanical Appliances.....1153
Current Electrical News.....1158
Record of Electrical Patents.....1163
Electric Vehicle Section.....1165
NATIONAL ELECTRIC LIGHT ASSOCIATION:
Complete Report of Annual Convention at Philadelphia—General, Commercial, Technical, Hydroelectric, Public Policy and Accounting Sessions—Convention Notes.1123
Abstracts of Papers and Reports.....1136
LETTER TO THE EDITOR:
Percentage System in Electrical Contracting.—By H. Bell.1148
BOOK REVIEWS.....1144
MISCELLANEOUS:
New York Electrical Society Meeting.....1120
Nela Research Laboratory News.....1120
Tablet to Wireless Operator.....1120
Utah Electric Club.....1120
John A. Britton.....1121
Outing at San Diego.....1121
Vehicle Reception in New York.....1121
Progress of Department of Machinery, Panama-Pacific Exposition.....1122
Official Opening of 30,000-Horsepower Plant Near Columbia, S. C.....1122
National Foreign Trade Convention.....1122
Lynn Section Elects Officers.....1122
Holstein Starts New Plant.....1141
Edison on Low-Priced Electric.....1141
Electrical Decorations for Shriners' Meeting in Atlanta..1142
Note on Proposed Specification for Wave Form.—By T. T. Fitch.....1143
Meeting of Society for Electrical Development.....1144
Electrical Installation for Childs' Restaurant, Louisville. By F. F. Valinoti.....1145
Meeting of the Electrical Contractors of Ohio.....1146
Meeting of Indiana Contractors.....1148
Among the Contractors.....1148
New England Electric Vehicle Convention.....1165

Copyright, 1914, by Electrical Review Publishing Company, Inc.

THE THIRTY-SEVENTH ANNUAL CONVENTION OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

The thirty-seventh annual convention of the National Electric Light Association, which is just closing as we go to press with this issue, has been in many ways unique. It has the distinction of being favored with perfect weather conditions throughout the entire week. The arrangements of both local committees were perfectly carried out and everyone visiting the Philadelphia convention has felt the highest degree of satisfaction with the convention. The location and the facilities of the meeting rooms where the various sessions of the convention were held were unexcelled, and the attendance and interest manifested in the papers and the committee reports were both remarkable. That there is a growing interest in the work of the Commercial Section was very manifest. This is as it should be, and the committees in charge of this particular feature of the convention program are entitled to the highest commendation for their selection of topics, of authors for the papers which were presented, and for the discussion which was elicited.

The recommendation of the Executive Committee providing for the discontinuance of the Hydroelectric and Transmission Section as a distinct organization and the placing of the work of this section in the hands of a special committee, was very well received and will, of course, be carried out.

The Public Policy Session, which was held on Wednesday evening, was in point of the interest shown and the large public attendance, one of the most brilliant affairs ever held under the auspices of the National Electric Light Association. The reading of the report of the Public Policy Committee by Mr. Samuel Insull and his earnest and well chosen advices with respect to considerations for the future development of the industry were classical in expression and were received with sincere and hearty enthusiasm. The participation of the Franklin Institute of the State of Pennsylvania in holding the exercises which commemorated the thirtieth anniversary of the first International Electrical Conference and Electrical Exhibition, which were held in Philadelphia in 1884, made the affair memorable, and the presence of such men, closely related to the development of the electrical industry, as Edison, Brush, Sprague, Rice and others, lent inspiration to this event of the week.

The setting of the exhibition of electrical apparatus and materials by the Class D members attracted spontaneous admiration from practically everyone present, and the Exposition Committee may well feel proud of the results of its endeavors.

STREET AND HIGHWAY LIGHTING.

Two reports were presented to the convention dealing with the lighting of streets and interurban highways. Both committees have included in their activities experiments along the line of actually equipping certain highways with lamps and determining what effects can be produced by definite types of equipment. The Committee on Street Lighting, of which Mr. John W. Lieb, of New York City, was chairman, has done some excellent work in studying the problem which confronts every city. Experiments have been made with both high-candlepower and low-candlepower units of both the arc and incandescent types. By the choice of proper accessories the distribution of light flux from such sources can be varied through a wide range. It is expected to continue these tests upon other streets, as well as those in New York City which have already been experimented upon, and the results should be extremely useful to other companies. Different equipment will be used in the new tests and the information thereby obtained will add greatly to that now available on this subject.

The Committee on the Lighting of Interurban Highways, of which Mr. George B. Tripp, of Harrisburg, Pa., is chairman, considered a subject which has received much less attention in the past than the lighting of city streets, and yet one which presents great possibilities of development in the future. The rapid increase in automobiling, among other causes, has created considerable demand for the lighting of country roads and many rural communities are now in a position to give attention to the adequate lighting of such highways. The experiments which have been carried out by the Committee show the value of this method of attacking the problem, and further installations of typical equipment chosen especially for its suitability to this purpose will give both central stations and consulting engineers data which will enable them to decide upon the type of units to be used in such installations in order to get an illumination which will be satisfactory, without running the expense to a point which will be prohibitive under the conditions involved. It is evident, of course, that funds will not usually be available to light country highways in the fashion that is prevalent in modern city streets. Units must be more widely spaced and the choice of wattage to meet such conditions is one which must receive the most careful attention. The study which has recently been given to outdoor illumination, the various ways in which it enables an observer to see, and the psychological factors which are involved, have greatly advanced this subject as an engineering problem.

The commercial possibilities involved in the development of this application of electric energy should appeal to every central station, but especially those which cover a territory extending beyond the limits of a single town or city. Where pole lines are already in existence along country highways for transmitting power between towns, the expense for providing highway lighting would not be so great as in other cases and a profitable field of development would seem to be opened by stirring up the enthusiasm of local residents along this line. If the proposed Lincoln Highway materializes, the central-station companies should make a determined effort to have it a model of good illumination throughout its length. While the same type of illuminating unit might not be desirable for all portions of such a highway, each unit selected should be suitable to the local requirements and should be made a model for other highways in adjacent territory.

FORMS FOR ELECTRIC RATE SCHEDULES.

The report of the Rate Research Committee this year includes a standard form for the construction of electric rate schedules. While a number of the state utility commissions have already adopted forms for filing electric schedules, there is, nevertheless, at the present considerable divergence in practice not only in different states but among electric companies not yet subject to such regulation. It will be for the benefit of all concerned if such schedules could be drawn up according to some uniform basis which would guarantee the inclusion of all necessary details and which would put the schedule in such form as to be easily understandable and avoid ambiguity. Members of the Association would do well to follow this standard form in preparing and filing their own schedules, and it would facilitate general convenience if the state commissions could find it possible to also adopt this uniform form.

At the present time one frequently comes in contact with forms of schedule which omit important items affecting the conditions of service under which such schedules are applicable, so as to make them ambiguous or leave doubt in the reader's mind as to whether they are applicable under given circumstances. The recommendation of the Committee that no abbreviations be used is also a good one, and the loose manner in which the term "kilowatts" has been used instead of "kilowatt-hours" by certain companies should be carefully avoided.

THE INDETERMINATE PERMIT.

In many minds it has been considered that a solution to the vexed problem of the proper length of time for the term of a franchise of a public utility company had been reached in the indeterminate permit, which is provided for in the public-utility laws of several states. Wisconsin, which has been a leader in the regulation of public service companies, in-

stituted a provision for the indeterminate permit and other states have followed her example.

In certain states, such as Michigan, there exists, however, a constitutional provision placing a definite limit upon the length of term for which a franchise may be granted. In other states there are upon the statute books laws having the same purpose in view of setting a limit upon municipal action in this regard. Such provisions seem to place an obstacle in the way of adopting the indeterminate permit. A recent decision of the Michigan Supreme Court, which is referred to upon page 1151, indicates that the interpretation to be placed upon the Michigan constitutional provision is that a franchise cannot be granted for a definite term longer than the specified 30 years, but that this does not prohibit a franchise of indefinite term which is revocable by the authority granting it. Since the indeterminate permit is customarily accompanied by a provision for municipal purchase whenever this may be desired, it would seem that such a permit would be permissible under the terms of this decision.

SIDE LIGHTS ON ELECTRIC AUTOMOBILE TOURING.

The reader of the proceedings of the electric vehicle convention at Boston on May 19 and 20 will find much to interest him in relation to the present development of electric automobile touring, as set forth in the paper of Mr. J. S. Codman. Within the last year the runs of various members of the staff of the company with which the author is associated have been given a good deal of well deserved publicity. That of Colonel Bailey from Boston to Chicago in October last at an average road speed of 15.6 miles, including highway stops, and several lesser runs, including at least two notable trips between Boston and New York at 20 miles per hour or over, are convincing evidence that the pure roadster type of car is as practicable a machine for country and interurban travel as the more common gasoline type. It appears that only two difficulties of any importance now stand in the way of a general application of the electric passenger vehicle to cross-country travel: the concentration of most manufacturers upon types of cars specially suited to town and suburban service, and the still too common failure of the small central station to realize its duty in relation to the provision of charging facilities.

There is little doubt that as soon as charging facilities become general, manufacturers will awaken to the merits of roadster-type cars. The demand for luxurious plush-covered rolling boudoirs is not likely to slacken, for the electric car de luxe will be an increasing factor in transportation along the boulevards, from office and home to country club and opera; but just as soon as the simplicity and reliability, the convenience and last but not least the speed of the electric roadster over long stretches become known by the public, and just as soon as the central station makes provision to give the passing electric vehicle a boosting charge of from 100 to 200 amperes directly off the exciter bus, a new day will dawn in the industry. The key to the situation lies in the hand of the small central station, and at a merely nominal expense it should prepare to encourage and meet this desirable business. Rare, indeed, are the plants which today can give the motorist more than 30 or 40 amperes, when what he needs in practical touring is an hour's boost at from three to five times this rate. It is not generally realized how much a modern storage battery will stand in the way of temporary boosting, but it was clearly brought out in the Boston discussion that both the Edison and lead types of cell can be subjected to very high rates of current input, provided care is taken to cut down the current rate before overdoing the matter.

It is worth noting that an exciter of 12.5-kilowatt rating at 125 volts will yield 100 amperes and that an exciting plant of 25-kilowatt rating will meet the most urgent demands of the electric automobile tourist for a hurried boost. In this boost lies the degree of success with which the tourist can make his trip with at least approximately the convenience of the gasoline automobilist. It is significant that in one case Mr. Codman secured enough energy to propel his car 50 miles by feeding 200 amperes into a 45-ampere Edison battery for a one-hour period, the charge being transmitted through a cable run from the station exciter bus to the car through a convenient window.

One other point, which is of much importance in relation to the popularization of electric touring, may be mentioned. That is, the high average speed maintained by a suitably designed electric roadster surpasses that made by the average gasoline car. Owners of the latter type of vehicle will not easily believe that the electric maintains in many cases a faster road speed, but observations made over and over again by Colonel Bailey prove this to be so, there being a difference of from 2 to 5 miles per hour. The gasoline car doubtless will far exceed the electric in maximum speed, but the sustained average over all conditions of the road is what counts more than spurts. No one need fear to be classed among the snails in a modern electric roadster of high power; in fact, the speed which some of these cars make with no apparent effort is a revelation to the passenger, and as soon as the central station in each town awakens to the situation, we may look for an extension of cross-country travel by electric automobiles which will surpass the predictions of all but the most enthusiastic. The day is passing when the owner of the pleasure car feels genuine enjoyment in detecting and remedying the mishaps of the internal-combustion engine and all its tribe of accessories; simplicity of equipment is going to be more and more a drawing card, and a notable multiplication of electric roadsters accompanied by price reductions is likely to be witnessed in many parts of the country in the comparatively near future.

New York Electrical Society Meeting.

L. A. Bauer, director of the Department of Terrestrial Magnetism, Carnegie Institution of Washington, gave a lecture on May 25, before the New York Electrical Society at Columbia University, on the work and the cruises of the non-magnetic yacht *Carnegie*, in execution of the task of a general magnetic survey of the earth. This vessel was launched at Brooklyn, in June, 1909, and the following August started a cruise of 8,000 miles in the North Atlantic Ocean. She started out for a world cruise, in June, 1910, returning to Brooklyn last December, covering on this second cruise 92,600 miles. We now have a fairly complete magnetic survey of the oceans between the parallels of latitude 55 degrees North and 50 degrees South.

Simultaneously with the magnetic survey work on the oceans, expeditions have been sent out to map the magnetic elements in distant and more or less unexplored portions of the earth. Thus far there have been 38 of these expeditions covering regions from Greenland to the Antarctic Islands.

The *Carnegie* leaves early in June for a cruise in the North Atlantic Ocean towards Norway and Iceland, returning to Brooklyn at the end of the present year. During the two years, 1915 and 1916, she will be cruising in the South Pacific and South Atlantic Oceans between the parallels 50 and 70 degrees South. Thus within the next three years it will be possible to issue new magnetic charts for the greater part of the globe, based on the data acquired by a single organization, according to a uniform method, and using appliances yielding results with the requisite precision.

On the average the magnetic declination (variation of the compass), the magnetic dip and the strength of the earth's magnetic force have been completely determined at points at sea 150 miles apart. Owing to the fact that the *Carnegie* is non-magnetic, it is not necessary to apply corrections to the magnetic observations made aboard, and it is possible to make known the results of interest to mariners promptly. The principal hydrographic offices the world over have the results of the *Carnegie's* observations within three or four months after they have actually been made.

The result of immediate practical importance of this ocean magnetic work is to provide mariners with standard values of the variation of the compass, so that by comparing the values observed aboard their own vessels, which are generally now-a-days constructed of iron and steel, with the *Carnegie* results, they can immediately determine how much their compasses have been affected by the iron aboard and can make allowance accordingly. In order to compensate properly a compass on account of the ship's magnetism, it is also necessary for the mariners to have correct charts of the lines of equal magnetic dip and of equal magnetic force, and these are likewise being supplied.

Notable errors in past magnetic charts used by mariners have been disclosed, and in the charts being issued at present by the leading hydrographic establishments these errors have been rectified.

After Dr. Bauer's lecture, Lieut. John Cyril Porte, who will be the pilot of the Rodman-Wanamaker transatlantic flier, addressed the Society on "Aerial Navigation."

Seventeen members were elected. The Nominating Committee announced that for officers for 1914-1915, the following nominations had been made: president, Frederick A. Scheffler; vice-presidents, Bernard Rowntree, George Weiderman, Sr., O. A. Kenyon; secretary, George H. Guy; honorary treasurer, James H. McGraw; treasurer, Henry J. Hoeltge. The election will take place at the annual meeting on June 10, when William P. Kennedy will lecture on "The Electric Vehicle in New York City," with motion-picture illustrations.

Nela Research Laboratory News.

The Research Laboratory of the National Lamp Works, Cleveland, O., has made arrangements for three university professors to carry on research work at the laboratory during their summer vacations. These men are C. E. Mendenhall, of the University of Wisconsin; W. E. Burge, of the University of Illinois; and Knight Dunlap, of Johns Hopkins University; whose work will lie in the domains of physics, physiology and psychology, respectively.

The director of the Research Laboratory, Edward P. Hyde, has also in mind the establishment of research fellowships for a period of one year, somewhat similar to the fellowships connected with educational institutions. The incumbent will be expected to engage in research work along a line determined by his own qualifications. For the year 1914 it is desired to appoint a fellow to work in ophthalmology, with an honorarium of $700.

The staff of the laboratory will be augmented during the summer season by Willibald Weniger, professor of physics in the Oregon Agricultural College, and by A. F. Wagner, assistant in physics at Purdue University, who will spend their vacation at the Nela Laboratory.

There has recently been established in Nela Research Laboratory (formerly known as Physical Laboratory, National Electric Lamp Association) a Section of Applied Science in addition to the Section of Pure Science which was established over five years ago. The Section of Applied Science will be separate and distinct from the Section of Pure Science and will not restrict nor in any way affect the established work in pure science.

Utah Electric Club.

The regular weekly luncheon at the Commercial Club, Salt Lake City, on May 28, the Utah Electric Club listened to an interesting talk on the Mexican situation by Anthony W. Ivins, apostle of the Mormon Church, who has been in charge of the interests of the Mormon colonists in Mexico for a great many years and who has been a resident of that country for forty years. Apostle Ivins spoke intimately of Diaz, Madero, Carranza, Villa and other Mexican leaders, all of whom he has known personally and with whom he has found it necessary in his official capacity to have many dealings.

He outlined briefly the history of the country and the causes which lead up to the present conditions. He expressed confidence in the Constitutionalists and stated that he believed they are fighting for the principles of personal liberty and equal opportunities, and that they will ultimately be able to work out the solution, if permitted to continue. He is hopeful therefor that the United States will not find it necessary to go into Mexico. His talk was one of the most interesting given for the Electric Club this year. The club has now adjourned its regular luncheons until after the summer season.

Tablet to Wireless Operator.

On May 23 there was erected in the assembly room of Public School No. 40, in New York City, with suitable exercises, a Tablet of Record to Ferdinand J. Kuehn, the wireless operator who perished in the collision between the steamships *Monroe* and *Nantucket* on January 30, 1914. Mr. Kuehn sent signals for aid from the *Monroe* up to the last minute, and then put on a life preserver, but seeing a woman without one, he gave it to her. The ship sank directly afterwards, and he was drowned, the woman being rescued.

The tablet is the gift of the Alumni Association and has been executed in heavy metal. A wreath of crossed laurel leaves surrounds the following inscription: "Ferdinand J. Kuehn, A Graduate of New York Public School No. 40, Class of 1910. Wireless Telegrapher of the *S. S. Monroe*, Sacrificed His Life January 30, 1914. Greater Love Hath No Man Than This That A Man Lay Down His Life For Another."

John A. Britton.

The story of many of the most important developments in hydroelectric generation of energy, long-distance transmission of power, and intense cultivation of its application to domestic and industrial lighting, motive power, farming and irrigation is written largely in the West. It is a fine thing to have been a part of this great story. It is a fine thing to have contributed to the inspiration and material achievement that have marked each step in this march of progress. It is a fine thing to have accomplished so much and still be in the forefront, full of vigor and enthusiasm, looking forward to more and greater opportunities.

The career of John A. Britton is unique. He is a pioneer and still a leader. He was in at the beginnings of things electrical. He is still a dominating factor in their most modern developments. His experience has brought him in touch with every phase of the electrical industry, and his efforts have again and again established new standards.

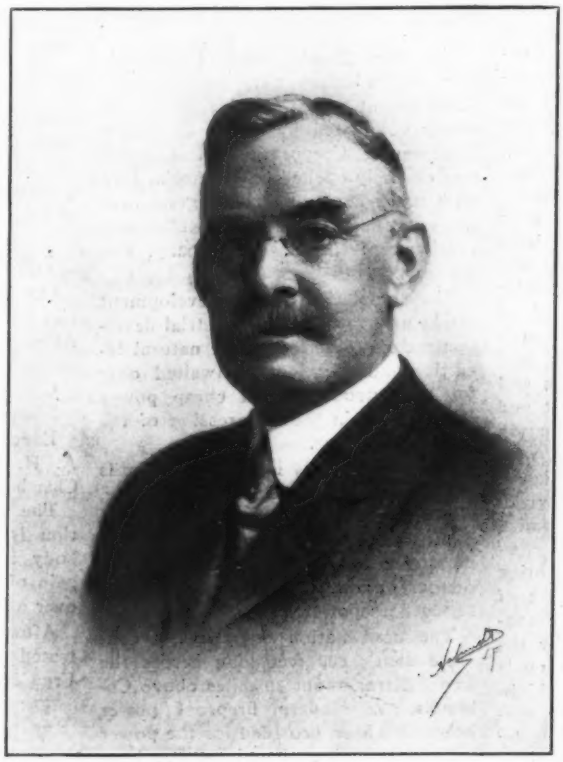
Born in Boston, Mass., October 9, 1855, he received his early education at the grammar school and high school of the city of Roxbury. He went to California in 1868, pursuing various employments, studying law meanwhile. In 1874 he entered the employ of the Oakland Gas Light Company, of Oakland, Cal., and he has been continuously in the employ of that company and its successors in interest ever since.

That company, with which Mr. Britton was identified as secretary, manager, engineer and president, made its first electric lighting installation in January, 1885.

In 1903 Mr. Britton was elected vice-president and general manager of the California Gas & Electric Corporation, which at that time was operating hydroelectric plants in the northern part of the State. These were the pioneer plants in California. He became president of that company in 1905, and upon the formation of the Pacific Gas & Electric Company became its president, remaining so until 1907; since that time he has been its vice-president and general manager and chief engineer.

As vice-president and general manager, Mr. Britton has had entire and exclusive charge of all construction work of the company, both in its steam and hydroelectric plants, and also its gas manufacturing and distributing; its water development for domestic and irrigation purposes, and the operation of its street-railway system; having also to do with the financial and operating policies of the company.

Mr. Britton has taken an active part in the affairs of California. He is president and secretary of the Pacific Coast Gas Association, and is a member of the Board of Regents of the University of California. Serving upon this Board from 1902 to 1914, he was, at the latter date, reappointed by the Governor of the State, for a term of six years. He is a member of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.



John A. Britton,
Vice-President and General Manager of the Pacific Gas & Electric Company.

Last year Mr. Britton was elected vice-president of the National Electric Light Association.

Outing at San Diego.

The Electrical Interests of San Diego, Cal., had a real old-fashioned "blow out" on Saturday, May 23, at the well known amusement park "Wonderland" at Ocean Beach, near that city. This was the climax to a number of successful weekly luncheons.

Promptly at 12:30 p. m. the parade of about 25 automobiles left the Plaza with the members and friends for the Beach, where a buffet luncheon was served. From that moment until the lights were out everyone was enjoying athletic events, cracker-eating contests, etc.

There were almost as many prizes as there were contestants. The most important event was the shot put, which was won by Mr. Hartwell, the dean of the electrical industry in San Diego, but it was discovered that the shot he used was made of aluminum instead of iron.

At 6 o'clock dinner was served to the 175 who were present, at the Casino, and then more talent was discovered as those called upon proved to be real entertainers instead of after-dinner speakers.

The success of the affair was mainly due to the efforts of Chairman Howell and Messrs. Nightingale, Crist, Holloway and Mayer.

Vehicle Reception in New York.

The New York Electric Vehicle Association held a reception on Thursday afternoon, May 28, in connection with the special exhibition of electric pleasure vehicles at the show rooms of The New York Edison Company. An orchestra furnished music, and tea and other refreshments were served. The Ladies' Auxiliary of The New York Electric Vehicle Association comprised the Reception Committee for the occasion.

The special exhibition of electric pleasure vehicles has proven enormously successful from a financial, artistic and social standpoint. It has afforded the manufacturers of electric vehicles an opportunity to meet and exhibit their wares under the most favorable conditions and incidentally it has given them the impetus to join hands for the benefit and advancement of the electric-vehicle industry. A new type of four-outlet Cutler-Hammer charging board was installed so that cars might be charged if necessary during the exhibit.

On Thursday evening a private view of the motion picture entitled "Selling an Electric Truck" was given. The scenario for this motion picture was written by a member of The Electric Vehicle Association of America and a number of the people prominent in The New York Electric Vehicle Association took part in the presentation of the play.

Progress of Department of Machinery, Panama-Pacific Exposition.

Since the recent return of Lieutenant George W. Danford, United States Navy (retired), chief of the department of machinery of the Panama-Pacific International Exposition, from an extended tour of the eastern states, the department has been actively engaged in the allotment of space in the completed Palace of Machinery. The exhibits will comprise the finest collection of electrical and machinery exhibits ever assembled under one roof, and the exhibitors are co-operating with the Department of Machinery in associating their exhibits with exhibits of others, thus permitting the complete operation and demonstation of the working of the various machines and electrical exhibits. Preliminary work was recently started on the installation of the first exhibit, a 500-horsepower marine Diesel engine, by the Busch-Sulzer Brother's Diesel Engine Company. This installation will cost $70,000.

To attract the non-technical visitor many spectacular exhibits have been arranged, and is is believed that the building may be made the most popular of the exhibit buildings. Several of the exhibitors have arranged, through the use of pumps, etc., beautiful and artistic effects, such as waterfalls and illuminated fountains. The latest and most modern methods of illumination will be displayed in connection with the exhibits in the Palace of Machinery. These will be of interest to the layman as well as to the student and specialist. One interesting feature will be a complete isolated electric house-lighting system for farm use. The testing of high-potential insulators and transformers will be made possible by the arrangements which have been made with the largest manufacturers of high-voltage testing apparatus. Many special electrical effects will be shown by the use of high-voltage apparatus.

A feature of the Palace of Machinery will be the methods employed for the convenience of the visitors. A number of plans are now being tested to insure engineers and students the opportunity to make a careful examination of each exhibit in privacy and comfort. Reception spaces will be provided in connection with each exhibit and equipped with suitable fixtures which will enable technical visitors to prepare notes on the various features. All of the working exhibits will be equipped with the latest safety devices which will form one of the most interesting exhibits to the engineer and manufacturer.

Trade Excursion by Utah Electrical Men.

The electrical interests of Utah were well represented on the Commercial Club trade excursion which left Salt Lake City on May 31 to visit all of the principal towns in northern Utah and southern Idaho. One hundred of Salt Lake's principal business men made the trip. Among them were G. W. Williams, of the American Steel & Wire Company; E. H. Eardley, of Eardley Brothers Electric Company; F. S. Hartzell, General Electric Company; C. B. Hawley, Inter-Mountain Electric Company; A. H. Denike, Mountain States Telephone & Telegraph Company; B. W. Mendenhall, Utah Light & Railway Company; and A. R. Loughborough, Western Electric Company.

Official Opening of 30,000-Horsepower Plant Near Columbia, S. C.

The Parr Shoals Power Company's new 30,000-horsepower, hydroelectric development near Columbia, S. C., recently completed by the J. G. White Engineering Corporation, New York, was officially opened on Memorial Day with much ceremony and a great deal of enthusiasm. E. W. Robertson, president of the power company, was the host.

The completion of this development marks an epoch in the industrial development of Columbia, where natural facilities and fine location waited only for the introduction of cheap power for a boom in the progression of the city's enterprises.

The Parr Shoals Power Company is a subsidiary of the Columbia Railway, Gas & Electric Company, of Columbia, S. C., and the new plant supplements the steam and hydroelectric stations of the parent company, which are rated at 14,500 horsepower.

The new station comprises a concrete dam 2,200 feet long across the Broad River about 30 miles above Columbia. A modern fireproof power house has been provided for the power generating units. Provision has been made for the eventual development of about 30,000 horsepower. The present installation comprises five generating units, operating at 35-foot head, which will generate 18,000 horsepower. Current at 60,000 volts will be transmitted to Columbia over a double-circuit, steel-tower transmission line.

Continued Growth of Electric Vehicle Association.

The Electric Vehicle Association is maintaining its pace of acquiring one or more new sections per month. At the Board of Directors meeting, held in New York on May 22, the petition for a Los Angeles Section was received and approved. Sections are now established in Boston, Chicago, Philadelphia, Washington, New York, Cincinnati, San Francisco and Los Angeles. Other sections are anticipated.

Progress is being made on the program of the fifth annual convention of the Association, which is to be held in Philadelphia on October 19, 20 and 21, at the Bellevue-Stratford Hotel.

National Foreign Trade Convention.

A national convention on Foreign Trade was held at the Hotel Raleigh, Washington, D. C., on May 27 and 28, under the auspices of the American Manufacturers' Export Association, the Pan-American Society of the United States, and the American Asiatic Association.

Among the list of honorary vice-presidents were the names of E. W. Rice, Jr., president of the General Electric Company; Guy E. Tripp, of the Westinghouse Electric & Manufacturing Company, and James G. White, of New York City. Among the papers presented was one by M. A. Oudin, of the General Electric Company, entitled "Government Assistance in Foreign Trade."

Lynn Section Elects Officers.

On May 21 the annual meeting for election of officers of Lynn Section, American Institute of Electrical Engineers, resulted as follows:

Chairman: W. H. Pratt.

Secretary: F. S. Hall.

Executive Committee: E. R. Berry, A. H. Burritt, C. H. Stevens, G. N. Chamberlin, R. J. Rudd.

The present membership of the Section is 116 members of the national body and 514 local members, a net gain of 118 during the year. There is over $1,000 in the treasury.

After the election a lecture, illustrated by lantern slides, was given by Fred M. Kimball, on "Mexico."

Volunteers Install Municipal Lighting Circuits.

The cost of installation of a municipal electric lighting service in Jeffersontown, Ky., was markedly reduced by the merchants and public-spirited citizens of that town, who volunteered as laborers to dig post holes, erect poles and help string wires. Jeffersontown is a small village 12 miles from Louisville, Ky., and the current will be supplied by the Louisville Gas & Electric Company, which has built a service line to Jeffersontown. The volunteers worked willingly during the latter part of May and the first few days of June and were promised that the current would be turned on by the tenth of June. The streets will be lighted by 15 arc lamps, to be operated under contract by the Louisville Company, which will also furnish current for power or light.

National Electric Light Association.

Complete Report of Thirty-Seventh Annual Convention Held at Philadelphia, June 1-5—General, Commercial, Technical, Hydroelectric, Public Policy and Accounting Sessions—Convention Notes.

(By Telegraph.)

The thirty-seventh annual convention of the National Electric Light Association was held in Philadelphia, Pa., June 1 to 5. Headquarters were at the Bellevue-Stratford Hotel. The registration bureau was opened here on Monday, June 1, after special trains had brought the convention delegates from all parts of the country.

Opening General Session.

The convention was called to order by President Joseph B. McCall on Tuesday morning at 10:30 o'clock, and immediately thereafter the Hon. Rudolph Blankenburg, mayor of the city, addressed the convention, welcoming the delegates to the city in an impassioned address dealing principally with the elimination of politics from city administrations in order that the best interests of the social and business structures might be conserved. Mayor Blankenburg considered the City of Philadelphia as eminently suited to the requirements of the convention and suggested that its connection with the early developments of the industry made it the natural place to hold an electrical convention. No industry conferred upon civilization, in all its characteristics, greater benefits than followed the introduction and wide use of electrical energy both for illumination and motive power. The use of electrical energy had a potent influence upon the development of civilization in rendering happier every condition of labor and living.

Upon motion of Samuel Insull, president of the Commonwealth Edison Company, of Chicago, the mayor was tendered a rising vote of thanks.

President McCall, in delivering the presidential address, spoke particularly of his appreciation of the Company Section work. He suggested careful consideration of possible changes in policy in handling future conventions and indicated that undoubtedly some method which would relieve those in charge of affairs of a tremendous bulk of work now involved in catering to the demands of the extensive work of the Association would be welcome. In order that there might be greater opportunity for the hammering out of the solution of numerous problems there had been imposed a stringent limitation in the number of papers to be presented at the present convention and it was hoped that the discussion of the various papers would be complete.

Mr. McCall spoke very earnestly with respect to the work of the Public Policy Committee and paid tribute to the foresight and intelligence with which this committee in its report to the 1907 convention had forecast the development that has come about and is with us today in the tendency to establish a regulated monopoly of public-service utilities under state and national regulation. He stated also that the work of this committee in laying definite information before the various state regulating bodies had achieved a great amount of good in establishing a better understanding of the conditions involved as to the relation of the public-utility companies to their patrons and prospective patrons.

Sketching rapidly the work of the various committees, he dwelt particularly on the value of the work of the Rate Research Committee and the interest being taken in the publications of this committee by the member companies. He also called attention to the work and asked for careful consideration of the labors of the Accident Prevention Committee, the Welfare Work Committee and the Accounting Committee. He especially recommended that the member companies adopt, to as great a degree as possible the recommendations made by the Accounting Committee with respect to a standard form of accounting and report.

Discussing the financial plans for the future work of the Association, Mr. McCall suggested that the income derived from all of the members was not sufficient to carry on effectively the entire work involved in the opportunity that lay ahead of the Association. It was in order that there should be re-rating of the dues of the Class A and Class D members, as these classes undoubtedly received the greatest benefits of the work of the Association and should support it accordingly.

Holton H. Scott, chairman of the Committee on the Organization of the Industry, reported for 1914 and 1913 respectively as follows: Class A members, 1,091 and 1,093, Class B, 10,817 and 10,256; Class C, 73 and 53; Class D, 250 and 242; Class E, 785 and 798. Owing to an error in previous reports, it has been found under a careful audit that the present year shows a considerable gain in membership, although the figures apparently disprove this proposition.

Attention was called to the fact that, according to the latest statistics, there are 6,129 central stations serving a population of 46,000,000 people. Of these, 140 holding companies operated in 2,691 cities, serving a population of 36,000,000 people.

Referring to the European trip of Secretary T. C. Martin, the Committee reported a very definite increase in the interest of the Association abroad, and the formation of a foreign company section with 22 Class A members.

The report of Secretary T. C. Martin showed that the miscellaneous work of the executive office was greater than ever, owing to the increased demands of the larger membership and the greater ramifications of the work of the various standing and special committees. There had been over 150 requests for the loan of the rate schedules and as many requests for the use of the library of the Accounting Committee. These documents have also been inspected hundreds of times at the executive headquarters in New York City. The secretary's office had issued 19,000 volumes of the Association's *Proceedings* and had provided more than 150,000 copies of the monthly *Bulletin*. A very important gain for the Association was the securing of the second-class mail privilege for the *Bulletin*, which will result in a saving of over $2,000 in postage, a greater part of which was already going back in the *Bulletin*, in improved service to the members.

The growing volume of publishing work carried on by the secretary's office made important the consideration of the question as to how far the Association could go in this direction. The business was being handled the same as any publishing business and called for a special staff of assistants. It was a question whether the money expended could not be put to better use in other Association effort, but at the same time it was quite apparent that as a result of this expenditure a great deal of very valuable personal service was being secured and information made available that could hardly be secured in any other way. Mr. Martin referred particularly to the splendid volumes represented by the *Meterman's Handbook*, the *Handbook on Overhead Line Construction*, and the *Electrical Salesman's Handbook*.

The Lecture Bureau had provided 81 lectures, using 1,000 stereopticon slides and employing three motion-picture films.

The tendering of three prizes for the best suggestion as to the reason for attending company-section meetings by H. H. Scott had stimulated considerably the interest in company-section work.

The Rate Research Committee and the Accident Prevention Committee were carrying on their work outside of the secretary's office and Mr. Martin suggested that consideration be given to concentrating this work at New York.

A great deal of earnest work has been accomplished by the Association's committee in cooperation with the Electric Vehicle Association of America in bringing to the attention of post-office authorities the adaptability of the electric vehicle in government service, particularly as it related to the handling of parcel post.

Annual-report forms have been secured from 24 public-service commissions. These range in their requirements all the way from a single sheet in one state to 100 folios in another state.

The report of the Insurance Expert was presented in person by W. H. Blood, Jr., of Boston, Mass.

Speaking to this report, Leonard Fitzgerald, superintendent, gas and electric department, Gary Heat, Light & Water Company, Gary, Ind., stated that a considerable amount of friction had been eliminated in his city by having the City Council approve the idea of the underwriters' inspectors taking the place of the city electrical inspectors in passing upon electrical construction.

The report of the Committee on Progress was presented in abstract by Secretary Martin, and Assistant Secretary S. A. Sewall presented the report on the Question Box.

Referring to the work of the Question Box for the year, Mr. Sewall stated that there had been 254 new questions, 1,296 answers and 746 contributors.

The paper entitled "Safety First" was presented in person by Paul Lupke and the first session closed with a rising vote of thanks and enthusiastic applause.

First Commercial Session.

The first session of the Commercial Section was held on Tuesday afternoon, with Theodore I. Jones, of Brooklyn, N. Y., in the chair. Vice-president E. C. Deal introduced Mr. Jones, who delivered his address as chairman of the Commercial Section. This reviewed the work of the past year, pointing out that the membership had reached 1,500. It is expected that this will be materially increased when constitutional changes relative to the dues have been settled. He commented particularly upon the work of the Publications Committee, especially with regard to the issuing of the *Electrical Salesman's Handbook*. This, he said, is a monument to the industry of the members of the Committee.

The report of the Finance Committee was then presented by E. L. Callahan, of Chicago, Ill. This showed the Section to be in a sound financial condition, due principally to the gratifying sale of publications made during the year. The income from this source approximated $6,000.

J. C. McQuiston, East Pittsburgh, Pa., called attention to the commendable work which the Executive Committee and the Committee on Publications have done. This has placed the Section in a healthy financial condition for the first time in its career.

J. F. Becker, of New York City, then presented the report of the Membership Committee.

This was followed by the report of the Committee on Publications, which was presented by Douglas Burnett, of Baltimore, Md.

J. G. Learned, of Chicago, Ill., called attention to the wide use which is made of the booklet entitled "Electricity in the Home," by the Public Service Company of Northern Illinois. Copies of this booklet are sent to all prospective home builders and excellent results have been obtained by this activity.

Louis D. Gibbs, Boston, Mass., said that many companies which are included in the 86 per cent not making use of the publications of the Commercial Section feel that these publications are too general in their character. This, however, is not true, as it would be impossible to give more specific information and yet be elastic enough to cover practically all conditions. It is important that all companies use this literature for the good of the industry.

William A. Donkin, Pittsburgh, Pa., explained that his company advertises in the daily newspapers that all these booklets will be supplied to anyone interested in them. The results have been very gratifying, as about 20 telephone requests for copies are received daily. In April of this year, 185 house-wiring contracts were obtained and much of this business was traced directly to the literature issued by the Commercial Section.

M. S. Seelman, Brooklyn, N. Y., commented upon the new house-wiring literature which the Section is preparing. This comprises a campaign of 13 separate pieces of literature. He considered this superior to previous efforts made by the Section, because of the value of consistent and correlated advertising.

C. B. Yonts, Dixon, Ill., suggested that, in future publications, data be presented that will enable the customer to make a judicious selection of lamps and glassware.

R. R. Young, of Newark, thought that there was a lack of proper machinery in central-station organizations to adequately circularize prospects. Much in the way of results depends upon people to whom advertising is directed. He strongly urged a department to handle this phase of work regardless of the size of the company.

F. C. Pullen, of East St. Louis, Ill., felt that publications issued by the Section were too general in character and did not contain sufficient matter of interest of housewives.

H. K. Mohr, of Philadelphia, Pa., stated that it was a comparatively simple matter for companies to add such material to these publications as they felt necessary to give local color.

Mathias Turner, of Cleveland, O., pointed out that it was desirable to send copies of all circulars and booklets to local electrical contractors, advising them that copies will be sent to their individual prospects upon request. This has been found to gain their confidence and support.

W. R. Collier, of Atlanta, Ga., advised that excellent results had been obtained by circulating the various publications gotten out by the Section. He also thought that more care should be given to the question of distribution. A carefully prepared card index of prospects is used in this connection in Atlanta.

The report of the Committee on Electrical Salesman's Handbook was presented by Charles J. Russell, of Philadelphia, Pa.

Norman Macbeth, of New York City, explained the indexing system which was used and complimented the Committee on including data on actual lighting installations.

The report of the Committee on Education of Salesmen was presented by Fred Jenkins, Chicago, Ill.

W. R. Putnam, of Salt Lake City, Utah, called attention to the necessity for correspondence courses where employees are scattered over a considerable area.

C. A. S. Howlett, of Schenectady, N. Y., advocated the practice of holding examinations following the delivery of a lecture, in order to determine what degree of attention had been accorded to the speaker.

E. W. Lloyd, of Chicago, Ill., outlined the work of the Central Station Institute, which has been inaugurated in that city, and commented upon the reasons which led to the establishment of this school. College graduates were found lacking in knowledge of sales methods and central-station practice.

Mike Hart, of Chicago, Ill., called attention to the educational meetings which are held by the employees of the Middle West Utilities Company at its various properties.

S. E. Doane, of Cleveland, O., briefly outlined the work of educating employees at the National Lamp Works of the General Electric Company. He thought that this is an executive rather than a legislative or judicial function of the company.

First Technical Session.

The first technical session was held on Tuesday afternoon, with W. F. Wells in the chair. The report of the Committee on Meters was first presented by P. H. Bartlett, of the Philadelphia Electric Company. In opening the discussion, Mr. Wells commented upon the fact that the income of the company and the good will of its customers depended upon the accuracy of the meters. The consensus of opinion brought out in the discussion of this report was that the work of the Committee in developing a new form of inexpensive maximum-demand indicator was the most important that had been done of recent years.

John C. Parker, of Rochester, N. Y., suggested that wherever any matter coming up before a state utility commission involved a discussion of metering, member companies should call in the Meter Committee at the earliest possible opportunity, in order that the full value of its services might be secured.

S. J. Lisberger, of San Francisco, Cal., suggested that future reports of the committee should incorporate instructions for testing in service. The old methods are liable to considerable inaccuracy. Incidentally, operating companies should give the manufacturers more definite data with respect to the requirements regarding demand indicators, especially with respect to the time interval.

In closing the discussion, Mr. Bartlett welcomed Mr. Parker's suggestion and stated that the Committee had already done considerable work looking to the establishment of standard forms of meter tests, but the volume of information elicited became so large that the Committee decided to call a halt. The Committee has been investigating the testing of meters in service and will undoubtedly report upon its work in this connection at a later date.

The report of the Committee on Grounding Secondaries was then presented by W. H. Blood, Jr., of Boston, Mass. The discussion of this report disclosed that mandatory grounding was generally favored.

Charles P. Steinmetz, of Schenectady, N. Y., suggested that failure to ground secondaries should in case of accident be considered *prima facie* evidence of criminal negligence.

In closing the discussion, Mr. Blood said, with regard to the relative value of driven pipes, ground plates and piping system, reports indicated that any system of grounding other than connection to piping showed great variations in intial resistance and generally a lack of permanency of the ground. Plates buried in coke gave somewhat better results, but even these are not satisfactory.

The report of the Committee on Electrical Measurements and Values was, in the absence of Chairman Kennelly, presented by E. E. F. Creighton, of Schenectady, N. Y. There was no discussion.

W. P. Kennedy, of New York City, then presented a paper entitled "The Greater Electric-Vehicle Problems." This was followed by an address on "Electric Vehicles" by Charles P. Steinmetz, of Schenectady, N. Y.

Dr. Steinmetz discussed the relation of the automobile to the central-station industry. He related the historical development of sports in general and traced the parallel case of the bicycle, showing how this passed through three periods, namely: intense development, height of popularity when the bicycle presented the dominant sport of society, and finally, the period of decay when it became a part of business transportation. The automobile is passing through the same experience. In its use of the automobile, society is meeting more and more on common ground with people of moderate means who can afford cheap automobiles, and already the automobile as a sporting proposition is in a decadent position. The parallel with the bicycle will be apparent, and just so soon as the automobile ceases to be little short of exclusive, it will take its place as a commodity and an adjunct to the conduct of business. The limitations which heretofore handicapped the electric vehicle with respect to speed and long-distance travel are being eliminated, and with the construction of electric vehicles having light batteries, light frames and light motors, there will be a corresponding reduction in price. The electric car of the near future will cost less than $500 and Dr. Steinmetz expects to see over a million of them in use within less than ten years. Estimating 10 kilowatt-hours as an average charge, and assuming that only a half-charge per day would be required, this would mean an increased revenue to the central stations of $75,000,000, based upon a rate of five cents per kilowatt-hour. This estimate could easily be doubled when electric trucks, delivery wagons and business tricycles of every description are considered. He urged central-station men very strongly to take hold of this business and control it while it is still in their hands. It would be undesirable to let garages handle this business, because of the natural spirit of antagonism to the proposition at the present time. If it is left to private garages, the competition of the isolated plant will become more formidable than ever. The most feasible and promising method at the present time appears to be for the central station to maintain and charge the batteries at a reasonable rate. He believed that at the five-cent rate it would be entirely feasible for the central station to make a fixed charge of $5.00 per month for charging, and $2.50 per month for maintenance. With a monthly expense of $10, it would be possible for an enormous number of people who are now able to buy an automobile but cannot afford to keep it up, to utilize the cheap electric vehicle of the future.

A. J. Marshall, secretary of the Electric Vehicle Association of America, in closing the discussion, stated that the Vehicle Association was organized to cooperate with the central stations and welcomed their affiliation and support.

First Accounting Session.

The first accounting session was held on Tuesday afternoon, with Holton H. Scott in the chair. Mr. Scott introduced H. M. Edwards, chairman of the Accounting Section, and Mr. Edwards presented the report for this section, outlining its organization and the work of the Accounting Committee. He suggested careful attention to the details of cost-keeping, central-station accounting and standardization of data, so as to facilitate examinations upon the part of regulating commissions. He also outlined a plan for organizing the Accounting Section along national lines, so as to bring control of Section affairs directly into the hands of committees and officers thoroughly familiar with the methods and work of accounting departments.

This address was discussed briefly by Charles R. Price, of New Bedford, Mass., and Charles L. Campbell, of Waterbury, Conn. Mr. Price related an experience which his company had had with the Massachusetts commissioners, who carefully and studiously examined corporation accounts. With regard to a recent issue of new stock for his corporation, the Commission had examined every detail, scrutinizing its contracts minutely. He could not express too strongly the necessity for extremely careful accounting.

Mr. Campbell offered a resolution suggesting the elimination of separate dues for the Accounting Section and recommending to the Executive Committee of the National Electric Light Association that the Accounting Section be organized along national lines.

Replying to a question respecting unification of accounting systems, Mr. Edwards stated that the committee was in touch with various state commissions and at an early date effective work would be done towards securing a uniform system of preparing reports.

The report of the Library Committee was then presented by C. L. Campbell, of Waterbury, Conn.

E. C. Scobell, of Rochester, N. Y., then made the report of the Committee on Question Box. There was no discussion of either of these reports.

Thomas J. Walsh, of Chicago, Ill., then presented a paper entitled "Costs and Statistics." The discussion of this paper brought out a general consensus of opinion that in order for statistics to be of value there should be a definite understanding among department heads and the accounting department as to the use to which statistics are to be put. The general practice of accounting departments is to close the books between the fifth and tenth of each month and have a record complete by the fifteenth of the month for examination by heads of departments.

Peter Junkersfeld, of Chicago, Ill., emphasized the importance of cost-keeping in central-station work, and stated that the industry is considerably behind other industries in perfecting this practice.

Homer E. Niesz, of Chicago, Ill., explained the work of the Expense and Budget Committee of the Commonwealth Edison Company. Appropriations are made at the beginning of each year for each subdivision or group of accounts, for which the department head is responsible. These are distributed over each month of the year and the monthly expense is compared with the amount of budget expense authorized by the committee. There is thus secured a direct check upon the tendency of costs, and it has been found that department heads do not, as a rule, overrun the budget unless unusal conditions arise, which, of course, are explainable. The department heads take pride in keeping within the budget allowance. The main function of the Budget and Expense Committee is to utilize statistics prepared by the accounting department, so as to regulate the expenses and keep them in proper relation to the income.

Second Commercial Session.

The second commercial session was called to order on Wednesday morning by President Joseph B. McCall, who turned the gavel over to Theodore I. Jones, chairman of the Commercial Section. E. W. Lloyd, of Chicago, Ill., presented the report of the Committee on Rate Research.

The discussion was opened by William J. Norton, who advocated uniformity in the schedules used for filing rates. The Committee is working with this end in view and various state commissions have indorsed the efforts of the Committee along this line.

M. Barker, of New York City, contributed written discussion dealing with the theory of cost of service for rate-making. This should be taken as the basis for rate adjustments, with the value of service as a secondary consideration. Application of the value-of-service theory is found in determining the proportion of fixed charges which big customers should bear.

R. S. Hale read discussion which had been sent in by Arthur S. Knight, of Boston, Mass. Mr. Knight pointed out that the price paid does not always represent the value of the service to the customer. The basis of rate-making should be primarily the cost of service, for if it be based on the value of service it would ultimately be taken out of the hands of the utility company by a commission, as is now the case with steam railroads. The fundamental principles which govern the fixing of rates should be the same for all companies.

Mr. Hale added that the rate of return from various classes of customers should be on the basis of what portion of the investment is used in serving them.

W. J. Norton pointed out that the value-of-service theory, when applied to large customers such as railways, permits the lowering of rates to other customers who are paying rates fixed on the basis of the cost of service.

Henry Harris, of Pittsburgh, Pa., expressed doubts as to whether the various state commissions would indorse the value-of-service theory in rate-making. He said that commissions would hold a rate based upon this theory to be discriminative.

J. C. Parker, of Rochester, N. Y., thought that the report of the Committee made too great a distinction between value of service and cost of service. Any rate-making without regard to cost would eventually work a hardship on the company if reductions had to be made.

M. O. Dellplain, of Syracuse, N. Y., expressed the opinion that commissions would consider the value-of-service theory from the same standpoint as they now view the obsolete theory of charging whatever the traffic will bear. The tendency of public-service commissions is to meet companies on a fair basis and the utility company should take the same attitude.

L. H. Schreck, of Poughkeepsie, N. Y., thought that the rate for street-lighting service should be given consideration by the Rate Research Committee. In many instances these rates are fixed arbitrarily by municipal authorities or others without regard to cost, and in fact many utility managers do not, themselves, know what this service costs. He recommended that the fundamental basis to be considered in arriving at the proper rates should be presented by the Committee.

E. W. Lloyd, in closing the discussion, stated that commissions in several states have already indorsed the application of the value-of-service theory to rate-making. A concrete example of this application, as put into effect by the Commonwealth Edison Company in soliciting business from ice factories in Chicago, was given.

A Nominating Committee was then appointed, consisting of L. R. Wallis, J. C. McQuiston, M. O. Dellplain and F. D. Pembleton.

The report of the Lamp Committee was presented by Frank W. Smith, of New York City. Preston S. Millar, of the Electrical Testing Laboratories, then conducted a number of demonstrations on incandescent and arc lamps supplied by manufacturers. There was exhibited a case containing incandescent lamps representing the development from 1887 to the present time; also various sizes of the new gas-filled incandescent lamps. Among the arc lamps exhibited were the old inclosed-carbon arc, the long-burning flame arc, the luminous arc and a new lamp with an efficiency of 0.4 watt per candle. A quartz-tube mercury-vapor lamp was also shown, as well as a new incandescent lamp being developed by the Cooper-Hewitt Electric Company.

The discussion was opened by J. W. Howell, of Harrison, N. J., who spoke of the desirability of establishing standard voltages for the operation of incandescent lamps. When carbon lamps predominated it was desirable to have companies operating at slightly different voltages in order to take care of the entire output of the factory. With tungsten lamps, the manufacturers can supply lamps to operate at a predetermined voltage and there is no advantage in having different companies operating at different voltages. In fact, if all operated upon a standard voltage the output of the factory would be more uniform and lower prices and more satisfactory operation would result. He described the gas-filled lamp at some length adding that there seems to be no limit to the size in which it can be manfactured. The production of the smaller sizes depends upon injecting a suitable gas into the bulb.

S. E. Doane, of Cleveland, O., complimented the Committee upon its very efficient work and he also complimented the Association upon its co-operation with the lamp manufactur-

ers. The future developments in the lamp industry depend upon a continuation of this co-operation and support.

Norman Macbeth, of New York City, called attention to some of the conclusions which could be drawn from the replies sent to the Committee by utility companies in answer to questions asked of them.

Frank W. Smith, in closing the discussion, pointed out that the liberality of central-station companies in the matter of lamp renewals has resulted in a higher average candlepower per customer in this country than in other countries where this practice does not obtain.

Second Technical Session.

The first report to be presented at this session was that of the Committee on Electrical Apparatus, of which L. L. Elden, of Boston, Mass., is chairman. F. D. Newbury, of Pittsburgh, Pa., then read a paper entitled "Temperature and Its Effect on the Power Capacity of Electrical Apparatus." The report and paper were discussed together.

C. W. Stone, Schenectady, N. Y., suggested that if we could get the air circulating within the electrical machine supersaturated, so that its water content would be evaporated just as the air struck the hottest part of the machine, the heat evolved could be very readily carried away from the machine. The question of insulation is a compromise. It we put in sufficient material of a fibrous nature to accomplish the purposes of design, the thickness involved runs the construction beyond reasonable limitations. The insulation must, therefore, be thinned down so as to get a rapid transference of heat. Apparently the best material for insulation, in order to get strength and compactness in design, must be mica or some material of a similar character. One other point to be kept in mind in designing electrical machinery is that the end turns should have ample space between them. If there is no opportunity for free access of air, or if the end coils touch each other, there is always liability of breakdown. With respect to the rise in temperature in the fields of turbogenerators, there is involved practically no limit to the temperature. Mica will withstand practically any temperature up to the melting point of the copper.

Mr. Stone also pointed out the necessity for careful investigation of temperature rise in machine conductors. An exploring coil placed either alongside of the conductor or at the bottom of the slot does not indicate the true condition. An exploring coil placed between two conductors will show more nearly the actual condition of affairs. Designers are often fooled by thermometer measurements. While the resistance method of measuring temperature will not always be infallible, it gives a close approximation in the case of electrical machinery.

E. E. F. Creighton, Schenectady, N. Y., suggested the use of an aluminum cell placed directly across the commutator terminals to practically eliminate flashing over due to heavy internal surges in the machine. Apparently one aluminum-cell arrester for every 500 kilowatts is necessary.

Mr. Newbury, in closing the discussion, raised the question as to the ultimate value of circuit-breakers with rotary converters. He was of the opinion that in many cases a bad flash-over is caused by the opening of a circuit-breaker upon overload, whereas, if the rotary converter were allowed to remain connected in the circuit, it would in all probability carry the temporary overload with only a little sparking at the brushes.

The report of the Committee on Underground Construction was then presented by L. L. Elden, as the chairman of the committee, Philip Torchio, was absent in Europe. The discussion of this report brought out the fact that very little satisfaction had been experienced in the ventilation of transformer manholes. The practice of installing transformers of large capacity in manholes should be avoided where possible. The necessity for uniformity in the rating of cables and thickness of insulation was also discussed. The committee will undoubtedly seek information with regard to the variation in the thickness of cable insulation for varying voltages, as found in the market at the present time.

The report of the Committee on Overhead Line Construction was then presented by Thomas Sproule, of the Philadelphia Electric Company.

John F. Gilchrist, of Chicago, Ill., opened the discussion by warmly indorsing the work of the Committee. Herbert A. Wagner, of Baltimore, Md., and A. C. Einstein, St. Louis, Mo., expressed similar sentiments. Mr. Einstein introduced a resolution relating to the approval given to the report of the Overhead Line Construction Committee in 1911 and asking for the rescinding of that approval. He suggested that the question of voltage limitation be eliminated. After considerable discussion the resolution was referred to a special committee to be appointed by the chairman.

This committee, under the chairmanship of Thomas Sproule, made a report at the session on Thursday afternoon.

Second General and Public Policy Session.

On Wednesday evening a notable meeting listened to the reading of the report of the Public Policy Committee by Samuel Insull, of Chicago, Ill. He dealt with an analysis of the development of the industry and the restriction of the confidence of the Association in the policy of adequate service to the public and the conduct of business along enlightened and broad-minded lines. Mr. Insull earnestly recommended a consideration of the future of the industry. He referred to the terrific check suffered by light and power companies in Great Britain through the iniquity of destructive measures and strongly advised the presentation to representatives in both branches of Congress of basic information relating to the benefit conferred by unrestricted developments, to the end that the greatest good to the greatest number might accrue. There is the possibility of great evil in the enactment by our Federal Congress of legislation concerning electrical business of an interstate nature which would tend to discourage national development. Only where the greatest opportunity is allowed through wide diversity of load and most extensive systems of generation and distribution, can full advantage be secured to all of the people. This is of the greatest importance to the people of small communities and rural districts, if they are ever to enjoy the comforts and conveniences which are now the privilege of those persons living in the large centers of population throughout the country.

The meeting was then turned over to the Franklin Institute of the State of Pennsylvania, and exercises were conducted in commemoration of the thirtieth anniversary of the first international electrical exhibition and conference, which were held in Philadelphia in 1884. Walton Clark, president of the Franklin Institute, occupied the chair, and Thomas A. Edison was present as the guest of honor. Short addresses full of spirit and inspiration were made by E. W. Rice, Jr., Charles Francis Brush and Frank J. Sprague.

Second Accounting Session.

The second accounting session was held on Wednesday afternoon. John L. Bailey, of Baltimore, Md., presented the report of the Sub-committee on Tentative Classification of Construction and Operating Accounts. He said that while the system of accounts presented is complete as to details, it does not necessarily cover the entire subject of accounting and should, therefore, receive additions before adoption. The classification is divided under the following heads: Assets, Liabilities, Reserves, Income, Operating Expenses, Commercial Expense, Deductions from Income, and Appropriations.

In opening the discussion, H. M. Edwards, of New York City, suggested that when the classification of accounts is publicly issued it becomes the expression of opinion of the entire electrical industry. It is, therefore, of particular importance. State commissions are awaiting a uniform system of accounts, so that the classification should represent accepted practice.

C. L. Campbell, of Waterbury, Conn., in discussing the question of uncollectible bills, advised the marking off of uncollectible bills on gross revenue receipts, in order that the account will really show the actual cash received.

T. J. Walsh, of Chicago, Ill., said that, as the Commonwealth Edison Company must share a certain portion of its revenue with the city of Chicago, it seems just that uncollectible bills be deducted from the earnings as indicated in the income accounts.

Dugald C. Jackson, of Boston, Mass., then made an address on "Appraisals," which was the feature of the session. He directed his attention to electric light and power properties. The interest on the investment in public-utility property is a much larger part of the total revenue than in a mercantile business. Instead of earning a gross annual revenue equal to or exceeding the capital investment, a public-service company ordinarily invests a sum in establishing its plant and business which is not less than four or five times, and frequently as much as 12 times, the gross annual revenue. This multiplies the proportion of revenue which must come to the investors if a reasonable return is to be paid on the investment. Competition does not introduce any inconvenience in the relations between the customer and the purveyor in ordinary business, nor is expensive duplication of capital caused where the fixed capital is small. But where general competition of utility companies furnishing a like service occurs, and there is duplication of investment, it causes a large inconvenience to the customers. When these considerations have been laid before the public in such a way that the ordinary individual can understand them, it has a remarkable enlightening influence and often leads to a fair appraisal of a utility property. The electric utilities might gain greater strength with the public and improve their stability by making annual statements of their investment and earnings of studied definiteness and completeness, whether required to do so by public service commissions or not.

W. W. Freeman, of Cincinnati, O., said that the demand for good accounting followed as a natural sequence to the advent of public-utility regulation. The real value of property may be established by appraisal. The public should be made to understand that demands for improved service must necessarily be met by increased rates. Mr. Freeman was of the decided opinion that appraisals would indicate that reasonable rates are being charged in nearly every case.

Third Commercial Session.

The third session of the Commercial Section was held on Thursday morning. H. H. Scott called the meeting to order at 10 a. m. George B. Tripp, of Harrisburg, Pa., was called upon to present the report of the Committee on Lighting of Interurban Highways. This report was illustrated with lantern slides showing experimental installations made by the Committee, as well as units recommended for use in this connection.

The discussion was opened by H. H. Newman, of Newark, who pointed out that the man who sells real estate should be considered as an important factor in securing this class of business. He is usually a prominent citizen in the community and can easily be made to realize the increased value which land will have if the highways are well lighted and if electric service is available to the purchasers of land.

S. G. Rhodes, of New York City, thought that the cost of maintenance for units of low intensity is one of the greatest factors in highway lighting. He considered the initial cost and maintenance of the refractors recommended by the Committee to be high and asked what reasons had governed the Committee in making this recommendation.

W. D'A. Ryan, of Schenectady, N. Y., assumed a case of lighting a highway between New York City and Buffalo, and recommended for such a case the use of 500-watt and 300-watt lamps spaced 300 feet apart and suspended at a height of 40 feet. He recommended the use of incandescent lamps on account of their simplicity, although later developments may serve to indicate the greater adaptability of arc lamps for this service. The present tendency is for states to undertake highway lighting, purchasing the lamps and maintaining them. Under these conditions, it is desirable that the equipment be standardized. A height of 40 feet is recommended, because this allows a suitable distribution of the light without bringing the lamps down within the line of vision. He thought there was a possibility for the use of concrete poles to be used jointly by all of the utility companies having lines upon public highways.

Mr. Ryan then called attention briefly to the lighting features which have been planned for the Panama-Pacific Exposition to be held at San Francisco next year. He pointed out particularly that it will be entirely different from any scheme of lighting which has heretofore been used. More than 22 new and unique effects will be obtained by special combinations of units and equipment. The principal feature of the spectacular display will be a bank of scintillators having an aggregate candlepower of 2,600,000,000. The light will be visible for 40 or 50 miles. Various effects of light projected on jets of steam issuing from several sources will be included.

All of the principal buildings will be lighted in accordance with a new system of flood lighting recently perfected. The towers of the buildings will be jeweled with multicolored glass upon which the beams of light will play continuously. Special poles and fixtures designed for the Exposition were illustrated.

George H. Stickney, of Harrison, N. J., spoke of the great possibilities of highway lighting from the central-station standpoint, particularly as a feeder for rural business. There is danger of making installations too pretentious at first, so that the cost will be prohibitive. He advised the use of small units with the substitution of larger ones when the conditions warranted it. Care should be used in selecting proper reflectors.

Thomas F. Kelly, of Dayton, O., called attention to three highway lighting installations in the vicinity of Dayton, aggregating seven miles. In these installations 75-watt series incandescent lamps are used, spaced 350 feet apart.

The lamps are equipped with radial-wave reflectors. The cost of these in-

stallations has been extremely low and exceptionally satisfactory results have been attained. Mr. Kelly added that the state had appropriated a fund for improving the highways in Ohio and the Dayton Power & Light Company is perfecting plans for such lighting which will be presented to the state officials for consideration. He thought that the co-operation of other Ohio utility companies should be extended in order to make it a state-wide proposition.

C. G. M. Thomas, of New York City, referred to conditions in parts of New York City supplied by the Queens County Lighting Company, which approximate interurban highway lighting in so far as the physical conditions are concerned. Small sizes of incandescent lamps are used 110 feet apart and equipped with radial-wave reflectors. He thought that the central-station company should guard against attempting to cover too much territory in this campaign for lighting business.

W. H. Cole, of Boston, Mass., said that more information is needed by the central-station companies before they can undertake to educate their respective communities in regard to highway lighting. He thought it was too early to make any specific recommendation as to the equipment best suited for work of this kind, and he recommended that further tests be carried out by the Association Committee with the object of compiling more accurate working data.

J. G. Learned, of Chicago, Ill., called attention to conditions in the vicinity of Chicago, where suburban communities form practically a continuous series of towns. Some highway lighting on the main thoroughfares outside of these districts is also being considered.

A. T. Hicks, of Trenton, N. J., pointed out the need for reflectors that will concentrate the light on the roadway, thus saving in necessary wattage.

Edward Curry, of Joliet, Ill., referred to the proposed transcontinental Lincoln Highway and said that some movement should be undertaken by the Commercial Section which could be participated in by all of the companies serving the territory along this proposed highway.

Mr. Tripp, in closing the discussion, explained that the Committee had inspected about 100 miles of highway which were equipped with approximately 60 different types of units. Recommendations which the Committee had made as the result of this inspection were merely preliminary and should not be taken as the final word with respect to this practice. His company in Harrisburg is at present installing equipment using the refractors referred to in the report and data will shortly be available regarding the costs for this installation.

A very interesting address was then delivered by Elbert Hubbard, of East Aurora, N. Y., entitled "Co-operation." In the course of his remarks, Mr. Hubbard paid tribute to Thomas A. Edison, stating that the present era will go down in history as the age of Edison. The value of co-operation in the electrical industry was pointed out and many instances were cited emphasizing the value of co-operative efforts.

First Hydroelectric and Transmission Session.

The first session of the Hydroelectric and Transmission Section was held on Thursday morning, with W. W. Freeman, of the Cincinnati Gas & Electric Company, in the chair. In opening the meeting, Mr. Freeman said that the admirable report prepared by Secretary Martin made any address by the chairman or report on progress of the Hydroelectric and Transmission Section by the Executive Committee unnecessary. He stated, however, that one matter which had received distinct attention during the year was the appointment of delegates on behalf of the Association to participate in the Conservation Congress which was held at Washington, D. C. Current reports on this matter have been rather misleading. As a matter of fact the proponents of state rights and federal privileges had locked horns, but Congress really had accepted and indorsed an expression of opinion which to a considerable degree represented a satisfactory attitude upon the parts of the various conflicting interests involved with respect to the proper development of natural water-power resources. For the Association delegates he could say that while they were not entirely satisfied, it was considered that much good had already been accomplished and that the result of the conference was a decided step in advance.

Mr. Freeman stated that after careful and mature consideration the Executive Committee was of the opinion that there was no particular advantage in continuing the Hydroelectric and Transmission Section as a distinct organization. This did not indicate any lack of appreciation of the importance and value of the work of the Hydroelectric Section and the opportunity for its development; but it was felt that in view of the limited possibilities of participation as a distinct organization, members could be given greater advantages if the work of the Section was delegated to a special committee similar to the Public Policy Committee, and those outstanding developments which called for special treatment were handled for members interested by a carefully selected committee. The necessity for a distinct body of officers with corresponding responsibility and payment of additional dues would also be eliminated.

After a brief discussion it was unanimously voted to accept the suggestion of the Executive Committee.

Secretary Martin then presented a brief abstract of the report of the Committee on Hydroelectric Progress. He referred particularly to the extraordinary development which has taken place in recent years in extending the distance to which power is transmitted, in increasing the amount of energy transmitted, and in increasing the operating voltage which is used upon long transmission lines.

Three papers on transmission subjects were then presented and discussed together. The first was by D. B. Rushmore, of Schenectady, N. Y., entitled "The Nature of Electrical Disturbances in Transmission Work." The next paper, by Selby Haar, of New York City, was entitled "Data on Modern High-Voltage Transmission Systems."

This was a collection of data pertaining to all the transmission lines which operate at voltages of 70,000 or higher. The highest is that of the Pacific Light & Power Company, 150,000 volts. There are 31 in the world operating (or under construction) at 100,000 volts or higher, and 56 at 70,000 volts or higher. One of these is for direct current, six for 25 cycles and 42 for 50 or 60 cycles. The average voltage per mile is about 1,200. Details are given of transformer connections, lightning protection, size of cables and generators, type of insulators, etc.

O. B. Coldwell, of Portland, Ore., then presented a paper entitled "Water-Power-Plant Economics."

W. N. Ryerson, of Duluth, Minn., opened the discussion with a reference to Mr. Coldwell's paper. With respect to storage reservoirs, he called attention to the fact that it is often overlooked that there is a point where it is more expensive to develop storage than to put in some auxiliary system of power generation. The object of storage is to take advantage of the maximum river flow, to cut off the tops of the peaks of the flood season and put them into the valleys. He also suggested that with respect to the computation of penstock sizes, Kelvin's law could be used for close approximation.

A paper by John A. Britton entitled "Hydroelectric Development in California" was, in his absence, presented by S. J. Lisberger, of San Francisco, Cal. This paper described the topographical conditions which establish the relations for generating capacities and opportunities on the Pacific Coast and traced developments of the great systems which are today the technical wonders of the world.

Third Accounting Session.

The third session of the Accounting Section was called to order by President Joseph B. McCall on Thursday morning at 10 o'clock. H. M. Edwards then took the chair and called upon E. C. Scobell, of Rochester, N. Y., to present a paper which had been left over from the previous session, entitled "Variations in Public-Service Systems of Accounting."

H. M. Edwards presented suggestions made by a subcommittee of the Public Policy Committee for the classification of renewal, replacement and depreciation charges. This matter was investigated by the Public Policy Committee because the classification of these items involves financial rather than accounting principles. The report recommended that the Executive Committee authorize the Accounting Committee to refer to these subjects in its standard classification of accounts in the manner indicated.

John W. Lieb, of New York City, said that the subject of this report ranged in importance with those of rates and valuations of properties. All companies must consider the subject of depreciation, for every state regulatory commission included this item in determining a fair return upon the investment.

H. A. Givney suggested that the New Hampshire Public Service Commission be sent a copy of the report, as it is now holding a hearing on the subject of depreciation.

A paper by H. B. Lohmeyer, of Baltimore, Md., entitled "Accounting for Merchandise Sales" was then presented. This was followed by a paper by Frederick Schmitt, of New York City, entitled "Suspense Accounts."

A. H. Holm, of New York City, spoke of the difficulties encountered in apportioning overhead charges when a certain percentage of the store-room expense is not apportioned on each article as it is used.

Franklyn Heydecke, of Newark, N. J., advised setting up a monthly reserve to wipe out uncollectible bills.

J. C. Van Duyne, of Brooklyn, N. Y., thought that as the amount of uncollectible bills is usually negligible, averaging not more than one-half per cent of the earnings, it is not necessary to carry such a reserve. He called attention to the practices of the New York Edison Company and the Edison Electric Illuminating Company of Brooklyn in this connection.

Charles L. Campbell, of Waterbury, Conn., thought that if bad debts are carried from month to month they should be carried over from year to year.

Two papers were then presented on "Mechanical Sorting and Tabulating Systems." The first was by F. A. Birch, of Philadelphia, Pa., and considered the subject in connection with disbursement accounts. The second was by G. L. Knight and C. V. Woolsey, of Brooklyn, N. Y., and applied to the inventory of transmission and distributing systems.

Mr. Knight called attention to the fact that a continuous inventory can be kept by a single clerk if the forms are adapted to a mechanical tabulator and are employed with that system of tabulation. Mr. Woolsey spoke of the economies that can be effected in accounting systems by using the various mechanical devices which are now available for this service.

A paper was then presented by Charles R. Lehmann, of New York City, entitled "Purchasing, Storing and Accounting of Coal for the New York Edison Company." This paper was illustrated.

The session was then adjourned, after some remarks from Chairman Edwards expressing appreciation of the excellent attendance at the accounting sessions.

Third Technical and Second Hydroelectric Session.

W. C. L. Eglin occupied the chair at the Third Technical and Second Hydroelectric and Transmission Session, which was held on Thursday afternoon. Prior to the opening of the formal program, Thomas Sproule, of Philadelphia, made a report for the Committee on Overhead Line Construction. The Committee recommended that the approval of Section III of the 1911 report be rescinded and that Section IV of that report be changed to read as follows: "(1) Scope. These specifications shall apply to overhead electric light and power line crossings (except trolley contact wires) over railroad right-of-way tracks or lines of wires."

Section III of the 1911 report contained an intercompany agreement form and specifications for joint use of poles by lighting and telephone companies. Paragraph 1 of Section IV of the 1911 report contained, in addition to the above, the following: "And further, these specifications shall apply to overhead electric light and power wires of over 5,000 volts constant potential crossing or constructed over telephone, telegraph or other similar lines."

A. C. Einstein, of St. Louis, Mo., then introduced a resolution reading as follows: "Resolved, that the National Electric Light Association as an association believes that no specification for the joint occupancy of pole lines having a voltage-limitation feature by inference or otherwise should be approved or adopted as its standard."

In the absence of I. E. Moultrop, chairman of the Committee on Prime Movers, the report of this Committee was presented in two sections by J. B. Klumpp, of Philadelphia, Pa., and J. F. Vaughan, of Boston, Mass. In abstracting the two portions of the report, particular attention was called to the extensive experiments made at the Ashley Street power house in St. Louis in getting boilers under way with oil-burning apparatus. It was found that the quickest and cheapest way was to cover the grate with a bed of selected coal, through which several strips of rags were run and on top a covering of wood kindling was placed. The whole fuel bed was then soaked with oil. When the torch was applied there was almost instantaneously a full grate of fire and in a few minutes the stoker can be started, adding fresh coal to the furnace. If forced draft is used only to force the boilers at the time of greatest peak load and not for regular service, the cost of the equipment is of greater moment than its operating efficiency. That installation which will produce the desired boiler capacity with the smallest outlay should be the one selected.

The report also referred especially to a cinder catcher employed by the New York Edison Company. This causes the flue gases to impinge against a wet baffle plate, from which it is deflected downward to a trough of water in which the cinders are caught. Considering the storage of coal under water, a careful estimate of a reinforced-concrete pit with a capcity for 25,000 tons indicates a cost of $5.72 per ton of capacity. Allowing fixed charged of eight per cent on this investment, the charges would amount to 46 cents per ton per year; whereas fire insurance on a fair quality of coal costing $3.00 per ton would not exceed five cents per ton per year.

The steam-flow meter, particularly of the recording type, is coming into more general use and receiving the recognition which it deserves. It has been found, however, that the best results can be obtained only when the flow meter is supplemented with a good feed-water regulator. Attention was called to the tendency of turbine manufacturers to reduce the area of the exhaust nozzles to the condenser. Com-

parison was made with the Parsons unit of the Commonwealth Edison Company, Chicago, where there are 240 square feet of exhaust area through the nozzle to the condenser. This is more than double the area allowed by some American manufacturers.

The report suggests the measurement of discharge water of hydraulic turbines by using the water wheel as a meter, its discharge curve having been previously determined by a Holyoke test of the runners. By keeping track of head and gate opening, either by frequent observation or by a continuous automatic record, the power input of the wheel can be determined. It can also be accomplished by determining the head as before described and measuring the actual discharge corresponding to various gate openings after the installation has been completed.

The report indicates that the gas engine with gas-producer plant is on the decline, in marked contrast to the remarkable growth and development of steam-turbine power plants. There is also an increasing interest in the use of the oil engine manifested by a considerable number of prominent engine builders.

The discussion was opened by T. C. McBride, of Philadelphia, who suggested that the criticism of condensers was not entirely fair to American manufacturers. Condensers are not designed to accommodate steam but rather to get rid of it. Where the condenser is properly adapted to the work in hand, the manufacturer can arrange the design so as to provide adequate area for steam entrance.

C. C. Herschel suggested using only a permanent means of measuring water. He did not think that any one would consider the use of anything but a meter for a small pipe line, and it is only when pipes of large diameter are involved that engineers resort to other expedients. The only efficient way of measuring the discharge of a turbine and thus keeping a continuous check upon its performance is by having a Venturi meter installed either in the penstock or the tailrace as a permanent portion of the apparatus.

A paper by Charles V. Seastone entitled, "Selection of Hydraulic Turbines" was, in his absence, read by W. N. Ryerson. There was no discussion of this paper.

The report of the Committee on Street Lighting was then presented by John W. Lieb, of New York City. This report presented an historical review of what has been done by the committee, which was appointed in 1894 and has each year presented a statement of the advances made, along with recommendations for increasing the effectiveness of street lighting by means of electric lamps. The paper and the illustrations which accompanied it attracted considerable enthusiasm.

The committee has now a complete testing system and is approaching the problem from a new viewpoint. For the first time the element of psychology is entering into the consideration of adequate street illumination. Tests are being carried out on two streets in New York City with high-power and low-power arc and incandescent lamps, with both uniform and nonuniform lighting characteristics. Undoubtedly the future work of the Committee will soon produce very important results.

Replying to a question raised by Frank W. Smith, of New York City, Mr. Lieb stated that, after sufficient tests have been made on the comparison streets now under observation, other tests will be made on other streets, so that typical information respecting illumination requirements of dissimilar characteristics would be secured. With regard to the time when data would be available, he could merely say that the committee would actively continue its work and make ready for presentation information as fast as it could be developed.

The report of the Committee on Accident Prevention was presented by Martin J. Insull, of Chicago, Ill. The Committee has drafted important instructions to Association members involving the publication of a booklet dealing with the problems of establishing "Safety-First" aid; a uniform type of blank for reporting accidents; a uniform method of tabulating causes and results of accidents; the establishment of uniform danger and safety designs adopted by the National Electric Light Association and other associations. A motion-picture film contrasting careful and careless methods of linemen has been prepared and may be rented by member companies. A complete booklet giving adequate information relating to the introduction of safety work and the organization of safety committees has also been made available by this committee.

Following the Committee report, a motion-picture film was presented and received with great interest. This indicates the use of eye protectors, safety belts, insulating shields or covers of the Marshall lineman's protector type, proper method of removing cover from manhole and guarding it with railing and grated cover, proper method of climbing poles and making way among network of wires on overhead structures, careful way of handling, stacking and carrying tools, and methods of applying immediate resuscitation in event of injury or shock rendering the victim unconscious.

The committee strongly urged central stations to take the matter in their own hands and establish safety rules and schools of instruction before the law-making bodies of the nation enact rules for such matters and put into effect more stringent and burdensome compensation laws. Successful safety work must be characterized by enthusiasm and co-operation upon the part of the employer, the employee and the public, and the proper spirit must be engendered by example from the top down and not from the bottom up.

Fourth Commercial Session.

The fourth session of the Commercial Section was held on Thursday afternoon, with Theodore I. Jones in the chair. The report of the Committee on Non-Peak and High-Load Factor Business was presented by George H. Jones, of Chicago, Ill.

The discussion was opened by A. E. Oltz, of Hammond, Ind., who suggested that additional data be compiled on electrochemical business, as this is of decided importance.

R. M. Stephenson, of Brooklyn, N. Y., stated that the Edison Electric Illuminating Company of Brooklyn does not make a practice of taking on the business of isolated plants in summer, because of the effect which this practice may have upon other customers. It is assumed that every class of business can secure service from the central station at a rate approximating or cheaper than the cost of the isolated plant, where steam is used only in winter for heating purposes. These plants save enough in summer by using central-station service to compensate for the additional cost of coal for heating purposes during the winter months.

R. D. Donaldson, of Philadelphia, Pa., referring to procuring the business of brick plants, called attention to a drying system wherein a coal furnace supplies heat through a system of tunnels to various kilns. This method has many of the advantages of steam-drying and it still permits of purchasing power from central stations at a saving over the cost of operating an isolated plant. In connection with stone-crushing plants he thought it advisable, on account of the heavy demands for power for crushing machinery, that hoppers be provided wherein stone can be stored. It can then be crushed during the noon hour and at other periods of light load. This has been found to materially increase the load-factor of such plants. In connection with securing business of office buildings, hotels, etc., in the

congested districts of the city, he thought that some system could be worked out by the central station whereby steam equipments in the various buildings, and perhaps also industrial plants, could be interconnected and thus effect a marked economy in coal consumption. This would permit of purchasing power from utility companies. He thought that some attention should be given to this subject by the committee.

H. H. Holding, of Newark, N. J., thought that the amount of off-peak business that a company can secure is very limited, as even a low rate for energy does not offer sufficient inducement to an industrial plant to change its manufacturing processes so that no current will be used during the periods of peak load on the generating station. He recommended that data be collected on the steam consumption of various manufacturing processes, as this has an important bearing on the power problem.

A. C. Smith, of Buffalo, N. Y., called attention to the desirability of the electrolytic load because of its off-peak characteristics and referred to the practice of the Buffalo company in offering especially low rates for this class of business. He described in detail an electric-furnace installation representing a load of 750 kilowatts, which is very profitable to the company, as well as economical for the customer.

M. O. Dellplain, of Syracuse, N. Y., called attention to the tendency in the industrial world toward greater efficiency in manufacturing processes and labor. He looks for a radical change in the present conditions relative to night work so that every employee will be allowed some time at night for sleep and some time during the day for recreation. This will mean an improvement in the load-factor of the central station and should be seriously considered in connection with this question as related to industrial policies.

J. C. Parker, of Rochester, N. Y., called attention to the load characteristics of the Rochester plant which may be considered typical of the well developed stations of the country. It was shown that one-third of the total investment in this property is in use less than one and one-half hours a day. He pointed out that this graphically indicates to what extent central stations can go to acquire additional off-peak business and to induce existing customers to stay off the company's peak. He stated that one manufacturer in Rochester, employing the highest class of labor has revised his manufacturing processes so as to use no power during certain hours of peak load in the winter months. Central stations must give manufacturers an incentive in the way of discounts to adopt this practice. He thought that a great many utility managers themselves did not appreciate the importance of this subject.

R. H. Knowlton, of Philadelphia, Pa., thought that no hesitation should be shown by central-station companies in publicly announcing that certain classes of business could not be served with profit to customers. He approved of the establishment of a low rate for isolated-plant business during summer months and thought that in many cases this would ultimately result in securing the business permanently.

F. C. Pullen, of East St. Louis, Ill., explained that by omitting stand-by charges for off-peak business considerable profitable business has been secured and the load curve appreciably improved.

R. H. Hillman, of Baltimore, Md., stated that the Consolidated Gas, Electric Light & Power Company has not found it necessary to make special low rates to get the business of office buildings, hotels and other establishments using considerable steam. The practice is to offer to connect such customers for a trial period of six months, with privilege of renewing this period, and if the service has been found satisfactory the customer is to enter into a five-year contract with the company.

J. W. Ruff, of Charleston, S. C., stated that although cottonseed-oil plants and fertilizer plants used considerable steam in their manufacturing processes no difficulty has been encountered in securing the business of these establishments when all the advantages of central-station service are pointed out to the customer. The company makes a rate of approximately 1.7 cents per kilowatt-hour for this business.

Mr. Jones closed the discussion by stating that the ice plants referred to in report were largely manufacturers of raw-water ice. The plants referred to in Chicago earn a rate of practically one cent per kilowatt-hour. Mr. Jones thought that in future conventions an entire session should be devoted to the discussion of power business.

The report of the Committee on Wiring of Existing Buildings was in three parts. Part I was read by R. S. Hale, of Boston, Mass.; Part II was presented in abstract by S. E. Doane, of Cleveland, O. These two parts were then discussed together. Chairman T. I. Jones opened the discussion by pointing out the necessity for eliminating small details in handling the small customer, if profit is to be made. The meter is the heaviest expense and if this can be substituted by an inexpensive control device, such as used in Europe, much business now impossible to secure can be obtained. Also the payment in advance for a stipulated amount of current per month opens the way for much new business from small customers.

E. W. Lloyd, of Chicago, Ill., thought that more simplified wiring is necessary if this business is to be secured at profit. In this connection the co-operation of the Underwriters must be secured.

W. M. Kerr, of New York, N. Y., referred to the political aspect of the question of the small customer. He thought that the report indicated the fact that the saturation point is a long way off.

J. E. Latta, of Chicago, Ill., explained the position of the Underwriters' Laboratories in co-operating with the electrical interests to promote still greater use of electricity. The code which is followed by inspection departments should voice the sentiments of the various interests comprising the industry.

W. A. Donkin, of Pittsburgh, Pa., described the house-wiring campaign carried on in that city recently in which business of small customers was solicited. This campaign resulted in securing approximately 3,000 customers having a connected load of about 100 watts each, controlled by an excess indicator. The revenue from this business aggregates $60,000 per year. There are still about 80,000 unwired houses in the territory served by the company which will be solicited on the same basis.

J. C. Weismandal, of Brooklyn, N. Y., spoke of the work by the Brooklyn Edison Company in securing the business of old unwired houses. Close co-operation with contractors exists. The central station finances the wiring where the customer desires to pay on the installment plan.

Parker Kemble, of Cincinnati, O., recited some experiences in securing small customers on a flat-rate basis. Fully 35 per cent of all customers on limiting devices have ultimately installed meters.

L. R. Wallis, of Boston, Mass., referred to the house-wiring campaign in Boston during which 769 houses were secured in the period of seven months. The average cost of wiring per house was $83.50. The company provides for financing the installation where a customer desires to make time payments, the only stipulation being that service will be used at least until the final payment is made.

R. W. Hoy, of Harrisburg, Pa., stated that 550 old houses were wired in 1913 by his company. A number of these are on a flat-rate basis with a

limiting device and 25 per cent have already applied for meter service.

H. R. Sargent, of Schenectady, N. Y., recommended that a committee be appointed to co-operate with the manufacturers and underwriters in arriving at standardization of simplified wiring devices and fittings.

R. R. Young, of Newark, N. J., urged that receptacles be located three feet above the floor instead of along the baseboard. This location was much more convenient to the customer and also eliminates much of the unnecessary damage to plugs and wiring by reason of hard usage when used along baseboards.

In closing the discussion on the first two parts of the report, Mr. Doane stated that wiring costs from $2 to $3 per outlet in Europe and the average rate per kilowatt-hour is 12 to 14 cents.

Part III of the report was then presented by Mr. Hale.

J. E. Latta, of Chicago, Ill., called attention to the necessity of using only safe wiring and devices. Much of unnecessary fire and life loss could be prevented if sufficient care were exercised.

A. W. Young, of Camden, N. J., stated that the practice of his company is to use No. 10 wire in kitchen and dining-room circuits so that heating and cooking devices could be used without danger.

J. G. Swallow, of New York, N. Y., thought that the present sockets and plugs are too frail in construction. Even though their current-carrying capacity is sufficient, the hard usage to which they are subjected destroys them prematurely.

C. E. Robertson, of Baltimore, Md., spoke of the anticipated action by the Underwriters of preventing the installation of flexible conduit and wooden molding in wiring. He thought that should this ruling be effected it would work great hardship on central stations in securing the business of small customers.

W. D. Hodgeson, of Glens Falls, N. Y., urged the standardization of plugs and receptacles by manufacturers as essential to the success of residential service.

J. E. Latta, of Chicago, Ill., called attention to the biennial meeting for the revision of the National Electrical Code which will be held in New York City during next March and to which central stations are invited. Chairman T. I. Jones stated that the chairman of the Commercial Section and its vice-chairman would act as official representatives at this meeting.

The report of the Committee on Electrical Merchandising and Advertising was then presented by P. H. Kemble, of Cincinnati, O.

L. D. Gibbs, of Boston, opened the discussion, stating that the tendency of the times is to simplify merchandising methods and advertising. He spoke of the "Safety-First" movement, stating that nothing will contribute more to safety in the home than the use of electricity. Demand improves quality and consistent advertising on the part of central stations will necessarily increase demand.

F. D. Pendleton, of Newark, N. J., emphasized the importance of maintaining prices on appliances so that dealers could sell on an equal basis with central stations. If this were done universally the electrical business, he stated, would receive considerable impetus.

J. G. Learned, of Chicago, Ill., presented statistics showing the extent of merchandise business of the Public Service Company of Northern Illinois during the past year. There were 285 vacuum cleaners sold, 296 washing machines, 3,462 flatirons, and 3,805 toasters among 50,000 customers. The company carries on a campaign on a seasonable device each month.

Mike Hart, of Chicago, Ill., spoke of the importance of making periodic inspection of devices that are sold to see that they give satisfactory service.

M. S. Seelman, of Brooklyn, N. Y., commented on the advertising suggestions presented in the report, pointing out the value of copy that draws attention and creates a desire for the devices advertised.

H. H. Newman, of Newark, N. J., stated that the sales managers of central stations are largely responsible for the success of salesmen under their supervision and that they should not hesitate to give credit for good work done.

P. S. Dodd, of New York, N. Y., thought that national education of the public through the national journals and magazines was necessary before the greatest utilization of electrical appliances will be made. In this connection he called attention to the Society for Electrical Development and work it has planned and is beginning to carry out.

George B. Johnson, of Chicago, Ill., mentioned that the annual revenue from sale of appliances by the Commonwealth Edison Company approximated $180,000. Its Electric Shop tries not to conflict with the special sales of department stores and electrical dealers.

The report of the Nominating Committee was presented by L. R. Wallis, of Boston, Mass., and the following nominees were unanimously elected as officers of the Commercial Section for the ensuing year.

Chairman, E. L. Callahan, Chicago, Ill.

Vice-Chairman, Douglass Burnett, Baltimore, Md.

Vice-Chairman, J. F. Becker, New York, N. Y.

Members of Executive Committee for term ending 1917, F. D. Beardslee, St. Louis, Mo.; E. A. Edkins, Chicago, Ill.; G. V. Walton, San Francisco, Cal.; J. G. Learned, Chicago, Ill.; H. N. McConnell, New York, N. Y.; George Weiderman, Brooklyn, N. Y., the latter representing the Electrical Contractors' Association.

Mr. Callahan was called to the chair and delivered a brief address. Greater effort will be made to have the committee work of the Section divided over the entire year.

Final General Session.

The third general session, which was the final session of the convention, was opened on Friday morning by the presentation of the report of the Committee on the Doherty Medal and the Harriet Billings Medal. In the contest for the former prize, which is awarded to the best paper presented before any company section, thirteen papers had been submitted; the committee recommended that the Doherty Gold Medal be awarded to Harold Goodwin, Jr., of Philadelphia, Pa. It also recommended that the Harriet Billings Silver Medal be awarded to H. B. Gear, of the Commonwealth Edison Company, Chicago. Honorable mention was accorded to the paper presented by Thomas Spourle, of Philadelphia.

A notable address was then delivered by J. M. Wakeman in relation to the definite plans now being worked out by the Society for Electrical Development, of which he is general manager. The report of the Committee on Memorials was presented by Secretary T. C. Martin.

A report was presented recommending certain changes in the constitution and by-laws of the Association. These were adopted. The principal changes are in making the treasurer of the Association an elective officer, and in revising the dues of Class A and Class D members. The new schedule practically doubles the dues of Class A members in cities of 10,000 population and over; it also establishes graded dues for Class D members, with a maximum of $2,500 per year.

A report was then presented on the probable hotel facilities in San Fran-

cisco next year, which it was declared would be ample. The Association then voted to hold its next convention at San Francisco during the week beginning June 6, 1915.

The Nominating Committee submitted its report, which was unanimously adopted. The following were then declared elected as officers of the Association for the ensuing year:

President, Holton H. Scott, of Henry L. Doherty & Company, New York City.

First vice-president, E. W. Lloyd, Commonwealth Edison Company, Chicago, Ill.

Second vice-president, H. A. Wagner, Consolidated Gas, Electric Light & Power Company, Baltimore, Md.

Third vice-president, L. D. Gibbs, Edison Electric Illuminating Company of Boston, Boston, Mass.

Fourth vice-president, John S. Bleecker, Columbus Power Company, Columbus, Ga.

Treasurer, W. F. Wells, Edison Electric Illuminating Company of Brooklyn, Brooklyn, N. Y.

Members of the Executive Committee, to serve for three years, Paul Spencer, United Gas Improvement Company, Philadelphia, Pa.; A. C. Einstein, Union Electric Light & Power Company, St. Louis, Mo.; Walter Neumuller, New York Edison Company, New York City.

The Nominating Committee recommended for re-appointment as secretary of the Association, Thomas Commerford Martin; this recommendation was heartily confirmed by the convention.

Convention Notes.

A great deal of attention was attracted by the arch of welcome which spanned Broad Street at Walnut Street, which was erected in honor of the convention by the Philadelphia Electric Company. It consisted of two graceful wooden pedestals at each side of the street, surmounted by a ball of openwork with lamps inside, and supporting a chain of lamps which ran from each pedestal to a medallion over the center of the street. Each string of lamps consisted of 24 1,000-watt gas-filled units in frosted globes. Four similar lamps occupied each ball at the top of the pedestals. Upon the medallion was displayed the emblem of the Association, the letters being outlined in frosted lamps. The decoration was designed by John T. Windrim.

A great many of the convention delegates from the West and South came to Philadelphia in the special trains which had been arranged for them. The Brown Special from Chicago, which proceeded over the Lake Shore and Lehigh Valley Railroads, carried 65 persons, including 11 ladies. In addition to delegates from Chicago, there were others from South Bend, Ind., Toledo and Cleveland, O., Buffalo, N. Y., and other points, including a special car from Kansas City, Mo. The trip was enlivened by a guessing contest, in which prizes were won by Mrs. W. E. Reese, S. E. Doane and M. T. Flynn.

The Green Special from Chicago went over the Pennsylvania Railroad and carried 110 delegates. This was a nine-car train including two diners and a special club car. A pool was arranged with three prizes for those guessing most closely the exact minute of arrival. These were won by R. W. Everson, C. B. Frayer and R. E. Lee.

Special cars brought delegates from Atlanta, Ga., and St. Louis, Mo.

An Information Bureau for convention delegates arriving at Broad Street Station was maintained near the center of the concourse, the Association emblem being displayed in the form of an electric sign eight feet high. The Bureau was open for business from Sunday noon until the end of the convention.

Two shifts of members of the Philadelphia Company Section were in attendance.

The Edison Electric Illuminating Company of Brooklyn sent over a train load of its employees to attend the sessions on Wednesday. There were 120 in this party, which had the use of a special train.

Representatives of the Stone & Webster Corporation met at an informal dinner on Tuesday evening in the Red Room of the Bellevue-Stratford Hotel. There were about 50 present and D. P. Robinson presided.

Friends of Frank H. Gale, of Schenectady, N. Y., heard with deep regret of the death of his wife on Sunday, May 31, from an attack of heart trouble. The Commercial Section sent a telegram of condolence to Mr. Gale upon receipt of the news, and similar action was taken by the Transportation Committee and the Exhibition Committee, of both of which he was a member.

A very pleasant feature of the convention was a notable gathering of past-presidents of the Association, including Frederic Nicholls, Toronto, Canada; James I. Ayer, Boston, Mass.; Samuel Insull, Chicago, Ill.; Louis A. Ferguson, Chicago, Ill.; Charles L. Edgar, Boston, Mass.; W. C. L. Eglin, Philadelphia, Pa.; John F. Gilchrist, Chicago, Ill.; W. W. Freeman, Cincinnati, O.; Frank M. Tait, Dayton, O.; Frank W. Frueauff, New York City; Dudley Farrand, Newark, N. J.; C. R. Huntley, Buffalo, N. Y.; W. H. Blood, Jr., Boston, Mass.; Arthur Williams, New York City; Ernest H. Davis, Williamsport, Pa., and E. A. Armstrong, Philadelphia, Pa.

Entertainment.

The convention opened with a reception to the president and other officers of the Association on Monday evening at 9:00 o'clock, at which there was music and dancing. In addition to music by a professional orchestra there was a promenade concert by the Peconela Orchestra of the Philadelphia Electric Company Section.

On Tuesday evening there was an excursion to Willow Grove Park, for which special trains were provided. This park is one of the finest amusement parks in the world and the electrical decorations were very attractive. There was a special exhibit of the electric fountain and the entire seating capacity of the covered stand was reserved for convention delegates for the band concert. The Jovian Order held a rejuvenation prior to the concert.

Sixty candidates were initiated, the Degree team being made up as follows: Jupiter, J. C. Vogel; Vulcan, Sidney Greenfield; Neptune, E. H. Boudwin; Pluto, F. P. Groves; Mars, W. T. Conn; Hercules, Walter Wright; Apollo, J. A. Savage; Mercury, H. D. Stuard; Avrenim, R. L. Cunningham.

On Thursday evening there was music and dancing in the ball room of the hotel, with an exhibition of modern dances by Mr. and Mrs. Lew Quinn, Miss Pritchard and Mr. Hemmer.

During the dance held at the Bellevue-Stratford Hotel on Thursday evening, George H. Hughes, of Chicago, presented an electric range to the delegate drawing the lucky number in a contest which was conducted by Mrs. Joseph B. McCall. J H. M. Andrews of Philadelphia, held the winning number.

L. A. Osborne, vice-president of the Westinghouse Electric & Manufacturing Company, gave a dinner to the officers and members of the executive and Public Policy Committees at the Racquet Club on Thursday evening. There were fifty present and brief remarks of an optimistic nature were made by the host, and by Joseph B. McCall, E. W. Rice, Jr., Guy E. Tripp, Walton Clark and Judge Joseph Buffington, of the United State Court of Appeals. The occasion was particularly enjoyable and happy. Others present besides the speakers were E. M. Herr, Arthur Williams, A. W. Burchard, Walter Cary, W. W. Freeman, Samuel Insull, Walter H. Johnson, W. A. Layman, J. R. Lovejoy, T. Commerford Martin, James H. McGraw,

T. W. Siemon, C. A. Terry, J. M. Wakeman and Charles W. Price.

On Monday afternoon there was a preliminary baseball game between the Philadelphia and Baltimore teams for the Westinghouse baseball trophy, Baltimore being the winner. This team played for the championship on Wednesday afternoon against the team representing the New York Edison Company. The New York nine won by a score of 13 to 1 before a large audience of baseball enthusiasts. Both games took place upon Franklin Field, the athletic ground of the University of Pennsylvania. The prize cups donated by the Westinghouse Electric & Manufacturing Company for the winning team were on display during the convention and attracted much attention. This year the Westinghouse Company has given an individual cup to each of the players on the successful team. The New York Edison team now has two legs on the Westinghouse cup and the Wagner cup, donated by H. A. Wagner, vice-president of the Consolidated Gas, Electric Light & Power Company, of Baltimore, Md.

On Wednesday evening covers were laid for 50 guests at a dinner given to members of the Public Policy Committee and other distinguished persons by Arthur Williams, president of the committee, and President J. B. McCall. The table was decorated beautifully with ferns and cut flowers and electric fountains. A souvenir edition of the convention number of the Philadelphia Electric Company Section magazine, *Current News,* was given to each guest in individual illuminated leather binding. Informal addresses were made at the close of the dinner and Mr. Williams presented, as presiding officer of the last New York Electric Show, to Thomas A. Edison, the guest of honor, a solid-gold medal bearing on its face the great inventor's portrait.

Those present were E. A. Armstrong, James I. Ayer, W. H. Blood, Jr., Samuel T. Bodine, Charles F. Brush, A. W Burchard, R. A. Carter, Walton Clark, Charles L. Edgar, Thomas A. Edison, W. C. L. Eglin, H. M. Edwards, Dudley Farrand, Louis A. Ferguson, W. W. Freeman, Frank W. Frueauff, John F. Gilchrist, Carl Hering, Charles R. Huntley, Samuel Insull, Dugald C. Jackson, George J. Jackson, W. H. Johnson, John W. Lieb, Jr., J. R. Lovejoy, Joseph B. McCall, Thomas N. McCarter, James H. McGraw, T. C. Martin, A. H. Manwaring, T. E. Mitten, Randal Morgan, Frederic Nicholls, L. A. Osborne, Robert B. Owens, Laurence T. Paul, Charles W. Price, E. W. Rice, Jr., F. W. Smith, M. B. Snyder, Frank J. Sprague, F. M. Tait, Guy E. Tripp, H. A. Wagner, W. F. Wells, Arthur Williams and O. D. Young.

Special entertainment was provided during the week for the ladies attending the convention.

On Thursday morning visits were made to points of interest in the city, under the guidance of Mrs. R. B. Mac Creery, and in the afternoon there was a musicale at the Manufacturers' Club. The program of twenty selections was about evenly divided between Mr. Rich, Miss Susanna Dercum, contralto, and Nicholas Douty, tenor. Ellis Clark Hammann was the accompanist. On Wednesday morning an automobile trip through Fairmount Park was arranged by a number of local electrical manufacturers. In the afternoon a visit was made to the University of Pennsylvania. In the evening there was a card party at the Hotel Adelphia.

Prizes in the form of current-consuming devices were donated by the General Electric Company, Hurley Machine Company, Simplex Electric Heating Company, Western Electric Company, and Westinghouse Electric & Manufacturing Company.

On Thursday morning there was a steamer excursion on the Delaware River to League Island Navy Yard, and the plant of the New York Ship Building Company. On the return trip Cramp's ship yard and other points of interest were visited.

On Friday a visit to the hydroelectric plant of the Pennsylvania Water & Power Company on the Susquehanna River was arranged by Herbert A. Wagner, of the Consolidated Gas, Electric Light & Power Company, of Baltimore. An afternoon train was taken over the Pennsylvania Railroad, the return being made in the evening. A luncheon supper was served en route. About 70 of the convention delegates took this trip.

Meeting of Class D Members.

A meeting of Class D members was held at noon on Thursday. James I. Ayer, chairman of the Exhibition Committee, made a brief talk stating among other things that the membership now amounts to 250. Resolutions of thanks to the committees and to the management of the Bellevue-Stratford Hotel were adopted. A committe for the ensuing year was elected, composed of the following: J. I. Ayer, of Boston, Mass.; J. C. McQuiston, of Pittsburgh, Pa.; C. L. Peirce, Jr., of Pittsburgh, Pa., and H. J. McConnaughy, of New York City.

At the San Francisco convention next year there will be no separate exhibit in connection with the convention of the National Electric Light Association. It was suggested, however, that an exhibit be made on the steamship plying between New York and San Francisco by way of the Panama Canal.

Exhibits.

The Class D members conducted an exhibit of apparatus in the roof garden of the hotel, and this was open during the entire week beginning at 10:00 a. m., on Monday. The exhibition room was elaborately decorated for this feature of the convention, and it was the opinion of everyone present that the exhibit, under the direction of H. S. McConnaughy, secretary, was the most artistic and thoroughly satisfactory display ever made by the Association. The exhibits, which were described in last week's issue, were made by the following companies:

American District Steam Company, Tonawanda, N. Y.; American Ironing Machine Company, Chicago, Ill.; Barnes & Kobert, Manufacturing Company, New Haven, Conn.; Bell Electric Motor Company, Garwood, N. J.; James G. Biddle, Philadelphia, Pa.; Carbolineum Wood Preserving Company, Milwaukee, Wis.; Central Station, New York, N. Y.; Century Electric Company, St. Louis, Mo.; Copeman Electric Stove Company, Flint, Mich.; George Cutter Company, South Bend, Ind.; Delta-Star Electric Company, Chicago, Ill.; Harvey Deschere & Company, Hoboken, N. J.; Edison Lamp Works of General Electric Company, Harrison, N. J.; Edison Storage Battery Company, Orange, N. J.; Electrical Review Publishing Company, Chicago, Ill.; Electric Service Supplies Company, Philadelphia, Pa.; Electric Storage Battery Company, Philadelphia, Pa.; Electrical World, New York, N. Y.; Federal Sign System (Electric), Chicago, Ill.; G. & W. Electric Specialty Company, Chicago, Ill.; General Electric Company, Schenectady, N. Y.; General Vehicle Company, Incorporated, Long Island City, N. Y.; Hubbard & Company, Pittsburgh, Pa.; Hughes Electric Heating Company, Chicago, Ill.; Hurley Machine Company, Chicago, Ill.; H. W. Johns-Manville Company, New York, N. Y.; Lombard Governor Company, Ashland, Mass.; W. N. Matthews & Brother, St. Louis, Mo.; Metropolitan Engineering Company, New York, N. Y.; National Lamp Works of General Electric Company, Cleveland, O.; Naugle Pole & Tie Company, Chicago, Ill.; Ohio Brass Company, Mansfield, O.; Otis Elevator Company, New York, N. Y.; Philadelphia Electric Company's Supply Department, Philadelphia, Pa.; Philadelphia Electrical & Manufacturing Company, Philadelphia, Pa.; Philadelphia Storage Battery Company, Philadelphia, Pa.; Pittsburgh Transformer Company, Pittsburgh, Pa.; John A. Roebling's Sons Company, Trenton, N. J.; Rumsey Electric Company, Philadelphia, Pa.; Sangamo Electric Company, Springfield, Ill.; Simplex Electric Heating Company, Cambridge, Mass.; Southern Exchange Company, New York, N. Y.; Standard Underground Cable Company, Pittsburgh, Pa.; Wagner Electric Manufacturing Company, St. Louis, Mo.; Western Electric Company, New York and Chicago; Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; Westinghouse Lamp Company, Pittsburgh, Pa.; Westinghouse Machine Company, Pittsburgh, Pa.; Weston Electrical Instrument Company, Newark, N. J.

Abstracts of Papers and Reports Presented at Convention of National Electric Light Association.

General Sessions.

Report of the Insurance Expert.

The relations with the underwriters continue to be friendly. The insurance expert represents the Association on the Electrical Committee of the National Fire Protection Association and in this manner keeps in touch with all proposed changes in the National Electrical Code. The Code is generally recognized as good engineering practice. Many cities have adopted the Code, but a few are afflicted with home-made rules which cause various kinds of trouble. The curbstone contractor and competitive lighting plants are still responsible for a certain amount of poor wiring. Both of these can be eliminated to a large degree by applying certain remedies. The National Electrical Code is revised once in two years, and the insurance expert welcomes suggestions as to advantageous changes in rules which contain objectionable features. To matters which will receive careful consideration at the next conference to be held in April, 1915, are the rules on constant-potential pole lines, over 5,000 volts and the rule as to the use of renewable or refillable inclosed fuses. Attention is called to the Hobart (Okla) case, where a company having a total capitalization of $135,000 has been sued for $90,000 for alleged negligence in causing the burning of a department store. This case will be fought with energy and a decision will probably be reached this coming fall. The insurance expert is vitally interested in this case and holds himself in readiness to assist in all similar cases for members of the Association. The attention of the Association is again called to the good work which is being done by inspection bureaus and the insurance expert recommends that this year pamphlets be sent out to all members of the Association, these pamphlets to be prepared under the joint supervision of one of these inspection bureaus and the insurance expert, and to contain an explanation of fire hazards in electric-lighting plants and methods for remedying them. Recommendation is made that the incoming administration give this matter early and serious consideration.

Report of the Committee on Progress.

The Report on Progress deals as usual with the general conditions of the industry, and presents its statistics as based on the United States Census figures of 1912 issued recently with other data on development. Sections then follow taking up public questions, such as the relations and usefulness of holding companies; the public service commissions and regulation; municipal ownership. Various features of engineering work are then discussed, one or two typical new plants being described rather fully. Then come a number of sections reporting the advances in different fields, such as lamps and lighting, electric vehicles, electric heating and cooking, railway energy and industrial power, pumping and ice making, signs and slogans, and electricity on the farm. There is also a brief department covering some miscellaneous applications of central-station energy. The report concludes with details as to recent educational and welfare work.

Safety First.

By Paul Lupke.

The paper calls attenttion to the necessity of reiteration for the purpose of driving a matter home to those whom it is wished to reach; it appeals to the rank and file for development of the prevention spirit. It points out various causes for the lack of this spirit and emphasizes the fact that in the prevention of accidents more than in anything else the interests of employer and employed are identical.

Commercial Sessions.

Report of Committee on Membership.

There has been a gain in membership of the Commercial Section during the year of 239 members. The number would have been much larger except for the objection to paying additional dues for section membership. This matter is under consideration by the Executive Committee and when it is settled there will undoubtedly be an increase. A printed list of members has been issued during the year.

Report of Publications Committee.

This report is divided under nine sections. (1) The total number of publications issued from June 1, 1913, to May 1, 1914, was 129,436 making the general total for the last two years 349,092. (2) 144 companies ordered publications during the past year, this number being 13.4 per cent of the number of company members. In general the size of orders has doubled since the previous year. (3) It is estimated that in 1912, there were about 1,850,000 unwired houses within central-station districts. The committee through its publications aims to secure the wiring of these houses. (4) The aim of the Committee has been to produce such campaigns and booklets as may be used by the member companies in mail campaigns, personal solicitation, etc. (5) The publications aim to develop residence service, electric business in retail stores, church lighting and street lighting. These publications are generally used in conjunction with follow-up letters by central stations. The committee is willing to furnish the inside pages only of covers, in order that companies may use the covers for advertising. (6) Among the proposed publications is a residence service dummy which is designed to aid in keeping correct lists of prospective customers and to aid in follow-up campaigns. (7) The Committee thinks that company members do not take full advantage of its publications as the issues of the same fall short of the useful field for the same. (8) The Electrical Salesman's Handbook is a new feature of the Commercial Section. This publication replaces the Electrical Solicitor's Handbook. (9) The Committee is circularizing manufacturers and central stations to the end that the standards of the Handbook such as size, etc., may be adopted by them as standard for all such publications.

Report of Committee on Education of Salesmen.

The Committee, through a letter to Class A members of the Association, has endeavored to ascertain whether or not they desire to institute educational work at this time on behalf of the employees of their sales divisions and in what manner this Committee can best serve them. Replies to this letter were, it is considered, sufficient in number and definiteness of character to warrant the Committee in believing that educational work of the nature indicated should be undertaken at the present time. The Committee therefore presents an outline for a course of study suitable for young men with common-school education wishing to take up central-station commercial work, and suited, in its judgment, to the needs of central stations in training or educating members of their sales divisions. The Committee also indicates how such a course can be effectively given.

Report of Rate Research Committee.

This report shows that the weekly paper published by the committee, *Rate Research*, is upon a self-sustaining basis with a circulation of 579, of which 454 are paid subscriptions. The committee has devoted its time to the consideration of the theory of rates and differentials between the various classes of service. It concludes that maximum rates cannot be based upon an actual cost theory but must be governed largely by policy and by precedent. An appendix to the report is devoted to a study of the value-of-service theory under the title "Basis of Rates." This theory is developed upon the premise that the rate to each class of consumers, as well as rates as a whole, should be determined by actual or potential competition under fair and permanent conditions—not temporary or destructive competition. After explaining the application of this idea and pointing out the various factors that determine the value of service to the user and to the utility company, it proceeds to explain existing rates upon this basis. It concludes that new classes of business should be taken on wherever possible at rates that will

provide additional revenue in excess of additional cost, and these rates should be no lower than are necessary to get the business. The committee has also prepared a general set of rules governing the form and construction of electric rate schedules. Member companies are urged to follow this form in listing their schedules and it is also recommended for general adoption by state commissions, with the end in view of having a standard uniform form in all parts of the country.

Report of Lamp Committee.

The report shows tables and curves similar to those prepared last year, but brought up to date as to the lamp sales of the different types, some information being included as to the average wattage of yearly sales for the past several years, the tabulation of the year's business by wattage and the percentage which this wattage bears to the total. The question of a possible uniform voltage for Mazda lamps has been touched upon, the practices of the several companies with regard to furnishing Mazda lamps on free renewal and otherwise, and the changes that have taken place throughout the year. An important chapter on "Development" shows the progress that manufacturers have made to date, together with the tabulation of new lamps standardized and types removed from the regular list during the year. There are other features of the report which make it a very interesting document.

Report of Committee on Lighting of Interurban Highways.

This report, the first to deal specifically with the Lighting of Interurban Highways, covers briefly this important subject. The Committee, however, after having given some serious consideration to the subject and having made an inspection of various forms of lighting and types of fixtures, lamps, appliances, etc., as installed and operating under practical working conditions, feels that more attention should be given to this particular classification of lighting in the future than has been evidenced up to the present time.

Inquiries both as a result of personal observation and by correspondence indicated two things: first, a great lack of information in hand about interurban lighting of highways; second, a unanimous desire on the part of central-station men to obtain information in detail regarding the latest developments in lighting units suitable for highway lighting. The report includes some practical references, suggestions and conclusions as to lighting units for this particular class of work.

Report of Committee on Non-Peak and High-Load-Factor Business.

This report treats of those classes of business recognized as the very heart of the central-station industry. Attention is directed to the necessity of adopting rate schedules and policies which will enable member companies to secure large volumes of business, the character of which requires the use of electricity at times when the central station can most cheaply furnish it. This class of business may be included under two general headings: (1) Those which have at the present time been most highly developed, among the most promising of which may be included—such lines as electric-vehicle charging, the manufacture of ice, etc. (2) Those classes which give great promise for the future, but which are at the present time more or less in process of development, such as the electric furnace, electrochemical process, etc.

Report of Committee on Wiring of Existing Buildings.

Part I. The collection of data on how much business yet remains to be done in wiring old buildings shows that most of our cities still have an immense development before them and may look forward to doubling, tripling and quadrupling the number of their customers in some cases to serving nearly ten customers for each one they have now. Most of this development will come from residences (which now presumably use gas or kerosene) and most of these will be of fairly small size. The growth of companies at the present time is coming from new buildings and, except in cases of special campaigns, only a very small proportion of the possible number of old buildings is being wired each year. The Committee recommends that companies should encourage their solicitors to go after old buildings. It should be easier to get the business when the central-station solicitor can do so, by means of unit prices, closing contracts on behalf of the wiring contractor without waiting for a special estimate in each case. The report of the Committee shows that such a plan is already in use in a good many cities.

Part II. This is a special report by S. E. Doane on the successful handling of the small consumer in Europe, based upon a long study of the subject.

Part III. On stanardization of plugs and receptacles the Committee reports that the underwriters are as yet unwilling to take any action, even although their present rules actually have the effect of encouraging the installation of lamp sockets to take heating devices, when receptacles would be better practice. The Committee also reports that on account of the patent situation it has not been able o make progress with the manufacturers. This Committee recommends that some committee of the Association be charged with following the matter up next year.

Part IV. The Committee was asked by outside parties to take steps toward standard specification for combination gas and electric fixtures, but decided that such specification, except as far as included in the National Code, would not be desirable.

Report of Committee on Electrical Merchandising and Advertising.

Part 1. A Merchandising Section, so arranged that any company wishing to start an electric appliance department may find therein instruction for the organization and conduct of this activity, including the equipment of a satisfactory salesroom, purchase of appliances, handling of stock, keeping of records, deliveries, and policies to be pursued in relation both to the internal management and to the general public.

Part 2. An Advertising Section giving concrete examples of successful appliance sales and campaigns, with reproductions of the advertisements that affected these satisfactory results.

Part 3. An Addendum embodying brief notes on "The Training and Handling of the Sales Force," "Advertising Principles" and a biblography covering the subject-matter of the report.

Report of Committee on Electrical Salesman's Handbook.

It is important that all information and data issued in the handbook should be kept up-to-date and the loose-leaf system makes this possible with minimum expense. Each member of the Commercial Section has received a set of loose-leaf sheets comprising (1) The Salesman and His Work; (2) Illumination; (3) Electric Power; (4) Electric Vehicles; also a pocket binder and a desk file. The committee has in hand for future use data on (1) fans and blowers; (2) electric elevators; (3) steam heating; (4) power applications; (5) electric heating. The committee recommends efforts leading to the general use of this system for the collection and use of information and data by electrical salesmen; the general adoption by manufacturers and member companies of sheets conforming to the standard specifications of the Publication Committee; the general adoption of the handbook index; and the systematic collection of information and data by each member of the Commercial Section, making such material available through the Handbook Committee.

Technical Sessions.

Report of Committee on Meters.

This is essentially a report of the work of the Committee during the year, covering in more or less detail the activities of the Committee responsive to individual or general requests from the members. Consideration has been given to the legislative questions affecting metering, which have arisen throughout the country during the year. A chart of the various public-utility regulations relating to meters, together with extracts from the laws and copies of the various rulings which have been promulgated by public-service commissions during the year are also included, together with the conclusions reached by the Committee in its consideration of these questions. The interest evinced by the members in general in the measurement of demand has been recognized by the Commitee, and the investigative work under way in conjunction with other committees, together with a review of the available demand instruments, is included. References are made to the standardization of instrument diagrams and standardization of shunts for instruments and meters, also to the recent developments in meters and apparatus pertaining to meter work; and to other miscellaneous questions. A complete bibliography relating to meters, comprising some 600 to 700 references, is included as an appendix to the report.

Report of Committee on Grounding of Secondaries.

The report is an abstract of data obtained from the member companies.

The data were prepared for use by the member companies which are having difficulty in convincing municipally and privately owned water works that grounding secondaries on the water mains does not affect the integrity of such piping systems. The data collected show that the smaller companies throughout the country are not paying as much attention to grounding secondaries as they should; that many companies are grounding to driven pipes and buried cones, neither of which methods is allowed by the Code. The report emphasizes very strongly the advantages of grounding on water piping systems and shows the unreliability of other methods. The report strongly recommends that more attention be given to this important matter in the belief that entirely aside from the humanitarian aspect, grounding secondaries is good business and in the long run is a profitable investment for the company.

Report of Committee on Electrical Measurements.

A brief outline is given of the course of events which led to the adoption of an international standard of electrical conductivity for copper, by the International Electrotechnical Commission, in Berlin, last September. The meaning of this international agreement is touched upon, and the English text of the agreement is appended, verbatim, for reference.

The Greater Electric-Vehicle Problems.

By William P. Kennedy.

This paper points out a number of the important electric-vehicle problems as a prologue to the address by Dr. C. P. Steinmetz. In the past the difficulties surrounding the introduction of electric vehicles were of mental rather than of physical nature. It is only recently that the acknowledged potential possibilities of this class of power consumption has received administrative attention from central-station interests as a desirable source of load. The development of the electric-vehicle industry needs nothing more urgently than cohesive and comphehensive administrative effort on the part of central stations. As a business proposition commanding attention from capitalists, the efforts put forth by the Electric Vehicle Association of America in its parcel-post project and the recently suggested relief of freight-terminal congestion, are merely first steps in a great movement. Numerous charging stations located at convenient points would cause an almost universal employment of the electric vehicle for commercial and pleasure use.

Report of Committee on Electrical Apparatus.

The report deals with the design of the more recent types of generating and converting apparatus, air-cooling devices, switchboard equipment and protective devices necessarily included in complete modern systems of distributions. New methods of switchboard control and the use of synchronous condensers for voltage regulation of high-tension transmission lines are of more than passing interest. The design of outdoor and indoor stations, and the elimination of personal and fire hazards in electrical systems should receive attention. Important advances in the development of temperature-measuring devices suitable for use in connection with electrical apparatus are described. Standardization work in general, including participation in the revision of the American Illuminating Electrical Engineers Standardization Rules has engaged the attention of the Committee throughout the year and the details of this work are treated at some length in the report.

Temperature and its Effect on the Power Capacity of Electrical Apparatus.

By F. D. Newbury.

This paper presents the information at present available on the heat and temperature conditions within large alternating-current generators, the safe temperature limits of the various insulating materials commonly used, and the significance of temperature measurements by different methods. The heat and temperature conditions within generators are shown by a number of temperature diagrams for typical heat paths within the generator. Actual temperatures as measured in generators are also given, showing that total temperatures from 100 to 130 degrees at the hottest part of the generator are not uncommon. A safe temperature limit of 105 degrees is given for treated cotton, paper, silk and similar fibrous materials. A temperature limit of 105 to 125 degrees is given for combinations of the above materials with mica on similar heat-resisting materials when both classes of materials are depended upon for insulation strength. With combinations of the same materials, but in which mica and similar heat-resisting materials furnish the entire insulation strength, a limit of 150 degrees is given. Various tests and instances of generator burn-outs are cited to support the temperature limits given. The significance of temperature measurement by mercury thermometer, resistance of windings and by thermocouples is shown.

Report of Committee on Underground Construction.

The report deals with a number of problems treated by members of the Committee who have had particular experience in these problems. One of the contributions deals with alternating-current underground-distribution practice as to junction boxes, fuses, oil switches and other devices for sectionalizing and interconnecting purposes. Another section of the report discusses the question of underground transformers, their method of protection, cooling, etc. The omission of emergency relief valves is recommended in all cases. Illustrations of ventilating transformer manholes are given. The third section reviews the practice of joint making for high-tension cables and recommends the use of the vacuum process for extra high-voltage cable joints. Section IV gives experimental data on protection of cables in manholes by the use of cement covering in comparison with asbestos and steel tape, showing a marked advantage for the cement covering. The fifth section shows a fruitless effort to discover an inexpensive underground distributing system. The report describes some types of construction less expensive than the standard drawing-in system and gives cost figures and other details. Section VI gives operating data on high-tension cables collected from member companies. A marked difference is shown in the thickness of insulation used for cables of relatively low voltages, but greater uniformity for high-voltage cables. The maximum allowable loading for different companies gives temperatures varying from 90 to 150 degrees Fahrenheit for the lead sheath; and tests made to supplement this information show that the temperature of the conductor would be as much as 75 degrees higher than the sheath. Attention is called to the possibility of varying the maximum loading with the seasons of the year. The cable burnouts for 2,300 miles of cables were 14.2 per 100 miles, of which 78 per cent were in cable section and 22 per cent in joints. The report makes reference to the organization of the Joint National Committee on Electrolysis, on which the National Electric Light Association is represented by three members, and advises member companies to co-operate with this National Committee. The Committee also co-operated with the Wire and Cable Sub-Committee of the Standards Committee of the American Institute of Electrical Engineers in the preparation of rules, which, however, are for the general trade and should not be applied to the specialized requirements of the member companies. A number of subjects on which the Committee could not report are recommended for action by the next Committee.

Report of Committee on Overhead Line Construction.

The report of this committee consists chiefly of a revision of the first two sections of its 1911 report covering primary and secondary line construction. This revised report is printed in full in a Handbook on Overhead Line Construction, which was prepared by a subcommittee. This handbook, in addition to the committee's report, contains descriptions of the methods and the materials employed in overhead line construction; also the necessary formulas for electrical and mechanical solutions of the various transmission and distribution problems. The handbook is in 11 sections and covers line construction for wood, steel and reinforced concrete poles and steel towers. The committee recommends that the subject of joint use of poles be very carefully considered. A joint pole committee, on which are representatives of the American Electric Railway Association, National Electric Light Association, American Institute of Electrical Engineers and the American Telephone & Telegraph Company, is now working on this subject, and its report will probably be presented to the convention of the American Electric Railway Association next fall.

Report of Committee on Prime Movers.

The Committee discusses twelve subjects which are of interest at this time, as follows: Cost of Steam-Power Stand-By Service, Forced Draft for Peak Work, Emission of Smoke and Cinders from Chimneys, Burning Pulverized Coal, Under-Water Storage of Coal, Fire Brick, Steam-Flow Meters, Surface Combustion, Condensers, Boiler Tubes, Foreign Practice and

Tendency, Letters from Manufacturers. The remarks on the "Cost of Steam-Power Stand-By Service" should be of interest to those who contemplate replacing steam power with water power, in that they show quite clearly what expenses cannot be eliminated if the continuity of the service is to be reasonably safeguarded. The article on "Forced Draft for Peak Work" is well worthy of consideration for existing stations where the boilers are subjected to extraordinary and unexpected demands for power or where they are overloaded. The review on "Foreign Practice and Tendency," is interesting as it shows what efforts the engineers of other countries are making to improve their plant efficiency. Apparently their mental processes have been similar to those of American engineers. In "Letters from Manufacturers," which the Committee received this year as heretofore, is a statement of what is newest in turbine and condenser development.

Water Power.—In continuing the work of last year on water power the following subjects have been taken up: Water-Power Plant Economies, Methods of Measurement of Water in Operation, General Principles Governing the Selection of Water Wheels, Use of Center Bearings Between Runners in Horizontal Double-Runner Center-Discharge Wheel Settings and Leveling of Shaft, Recent Results with Kingsbury Thrust Bearing, Water-Wheel Testing Flume.

Gas Power—A review is presented of the recent developments in oil-engine manufacture and the tendency in price of available fuel oils. A considerable discussion is given of the factors surrounding the use of the heavy-oil engine and of various conditions that should be taken into account when considering this type of prime mover. This part of the report is of a general character and is supplemented by tables and illustrations in order to present the status in an instructive manner. But little is mentioned of the gas engine and producer as nothing of particular note has been brought forward during the twelve months just ending. Casual notes on the Humphrey pump and on the high-pressure distribution of producer gas have been added in order to bring the information of previous reports up to date.

Hydroelectric and Transmission Sessions.

Report of Committee on Hydroelectric Progress.

This is Part 2 of the General Report on Progress and is devoted more particularly to work in the hydroelectric and power-transmission field. Attention is directed by it to the treatment of water-power and conservation problems in national and state legislation, and the various aspects of the question. Information is given as to a number of interesting plants and installation, as well as to the later feature of long-distance line construction, outdoor sub-stations and other features of the work, while especial notice is given to the rapid rise in voltage, distance of transmission, and other results due to improvement in the art. One section of the report deals with foreign progress and projects.

The Nature of Electrical Disturbances in Transmission Work.

By D. B. Rushmore.

Electrical disturbances in high-tension power-transmission systems may be divided into two general classes; first, those caused by high currents, and, second, those caused by high voltages. High currents may be the result of overloads, causing excessive heating with subsequent burn-outs. They may also be caused by short-circuits, and the very high momentary values of these currents may result in severe mechanical strains, and breakdowns of the apparatus on the system. The destructive effects of excessive currents may be reduced by increasing the reactance in the circuits, and this is now often accomplished by providing external power-limiting reactances. The system should furthermore be so sectionalized and provided with selective switching devices that any disturbance will be confined to the smallest possible area. High-voltage disturbances may also be divided into two broad classes; first, those covering actual high voltages, in which the excess voltage exists between the phase conductors, or between the phase conductors and ground; second, those covering localized high voltages in which the excess potential condition exists between two points along the same conductor. To the first class belong those disturbances which are caused by poor disturbances which are caused by poor regulation and resonance, while the nature of disturbances caused by switching and lightning may be such that they may belong to either class. Where the impulses or traveling waves set up are of comparatively low frequency with slopings wave front, the disturbance can generally be classed with the former, and where of high frequency and a steep wave front, to the latter. The regulation of modern transmission systems is generally improved by providing synchronous condensers with automatic voltage regulators. The field is then adjusted so as to make the condenser take a lagging current at no load and a leading current at full load, in the first case to offset the effect of the line capacity, and in the second, to offset the surplus lagging load current. The aluminum-cell lightning arrester possesses ideal characteristics to protect against such high-voltage disturbances, where the excess voltage occurs between the phase conductors or between the phase conductors and ground. Overhead ground wires are also very generally used to protect the lines against atmospheric charges. The nature of high-frequency disturbances, on the other hand, is a comparatively recent discovery, and the means and methods for protecting against them are still being studied and investigated. As such disturbances are liable to damage the interior of transformer windings it is advisable to heavily insulate not only the end turns of the windings, but the individual coil groups as well. Inductances and energy absorbing devices may have to be relied upon for protection against these disturbances.

Water-Power Plant Economics.

By O. B. Coldwell.

This paper is a general discussion of some important elements entering into the design, construction and operation of hydraulic plants which have to do with economy. As a general thing the operating cost in a water-power plant forms but a very small percentage of the total cost of production. For this reason the subject of economics in plants of this type has not been given as much attention as the economics of steam-driven plants. An interesting diagram is given to show the comparison of total costs of steam and water-power plants, which are analyzed into operating and investment costs. The author points out the need for careful consideration of the character of the stream and watershed in determining the design of the plant and shows how this influences the ultimate economy. He considers in detail various types of hydroelectric plants and shows the relative advantages of different types of headworks, intakes, conduits, penstocks, pondage, main units and auxiliaries, recording instruments, draft tubes and tail-races. He points out the influence of many features in connection with these details on economy. He advocates the extensive use of electrical control of gates and other auxiliary apparatus. Recording instruments showing the actual flow of water and the output should be available so that the operatives may know what is actually being done by the plant. In connection with a plant having a limited water supply it is important to conserve the water as much as possible so as to be able to carry the peak load without difficulty. The operators should therefore know the influence of each operating detail on the efficiency of the plant.

Selection of Hydraulic Turbines.

By Charles V. Seastone.

In this paper the author calls attention to the importance of a careful study of the design and characteristics of turbines needed for any particular installation in order to secure economy of operation under the varying conditions of head and load to which the plant may be subject. From Holyoke tests the engineer now has the data which will enable him to make a comprehensive study and intelligent selection of the type of runner best suited to his purpose. The subject is treated in a non-technical manner under four main divisions: first, type of unit; second, size of unit; third, type of runner; and fourth, general character of design. The author points out that the selection of the type of unit is largely dependent upon local conditions of head, head variations, economy in design of power house, etc., also that no general rule can be laid down covering the size of a unit, which is dependent upon the character and magnitude of the probable load and available head. The author gives some attention to the type of runner, pointing out the general features that should receive careful consideration in its selection, including efficiencies under the ordinary range of operating conditions and fluctuations of head. The various points are illustrated by diagram.

Accounting Sessions.

Report of Subcommittee on Library.

The collection of accounting forms kept on file at headquarters has proved very useful to visiting representatives of companies. A collection of forms is also sent to member companies for inspection and return. There has been added to the library this year a collection of forms for annual reports used by various state commissions and a set of accounting orders prescribed by commissions.

Costs and Statistics.

By Thomas J. Walsh.

The Commonwealth Edison Company has, as a part of its organization, a Budget and Expense Committee, whose duty it is to study and pass on investment budget work and operating expenses, and it is part of the purpose of this paper to describe the methods used by it in the study of expenses. This company has adopted the standard classification recommended by the Association and has subdivided the accounts to fit its requirements, that is, to enable a comprehensive analysis of the various expenses. The different accounts are computed on some appropriate unit basis and the data and statistics are plotted and typewritten on sheets designed for this purpose and illustrated in the paper, and show how a direct comparison of the money spent by the departments each month is made with the previous month and the corresponding month of a year ago, also the cost per unit shown graphically. The paper also describes the method by which each department head receives the information necessary to make a scientific study of the expenses for which he is held responsible.

Report of Committee on Uniform System of Accounts.

This is the report of a subcommittee giving a tentative classification of standard construction and operating accounts, with explanatory notes defining the scope of each heading. A decimal system of indexing is used in designating the subdivisions coming under the general headings.

Accounting for Merchandise Sales.

By H. B. Lohmeyer.

This paper describes the new accounting methods recently adopted by the Baltimore Consolidated Company which has branched out extensively in the merchandising business. The methods outlined cover the routine from the sale to the billing and entry on ledger and monthly profit-and-loss statement. It also shows a concise method of stock records which does away with the necessity of individual stock cards.

Suspense Accounts.

By Frederick Schmitt.

The paper describes the limited extent to which the term "Suspense" was used in former years in accounting phraseology and shows how, in modern times, this practice has been greatly diversified. For the purpose of discussion a list of suspense accounts now generally used is divided into two groups; first, those accounts which are of a doubtful nature; then those commonly known as "Clearance or Apportionment" accounts. The second group of accounts is subdivided into Work in Progress, Burden or Overhead Expenses, Deferred Charges and Miscellaneous Charges. A general description of all the accounts is given in the order in which they appear on the list—some described in a concise manner, others more at length. Special thought is given to the method of keeping Storeroom Expense account as well as the treatment of cash discount recovered through prompt payment, because these items brought forth considerable discussion at the last convention.

Mechanical Sorting and Tabulating Systems in Connection with Disbursements Accounts.

By F. A. Birch.

This paper describes in detail the operation of a very effective system of accounting for purchases and the distribution of charges to the classification expense accounts. It also describes the manner in which distribution of operating expenses may be very advantageously handled upon the Hollerith tabulating machines, with a resultant saving in time in getting out monthly reports. Congestion which formerly prevailed at certain very busy periods each month is now entirely eliminated, and the entire accounting procedure relating to voucher distribution is rendered very much more harmonious. The tabulating machines afford a very valuable check upon the mathematical accuracy of a month's work, and expedite posting to general and auxiliary ledgers, with a consequent ease reconciling details with controlling accounts. The paper also describes briefly the advantages in handling consumers' special deposits on the tabulating machines.

Mechanical Sorting and Tabulating System As Applied to the Inventory of Transmission and Distributing Systems.

By G. L. Knight and C. V. Woolsey.

This paper describes the use of sorting and tabulating machines in obtaining statistical data for reports on the physical property of transmission and distribution systems. The paper is intended to act as a handbook for systematizing the methods of taking the inventory either originally or during any given period, and for the design of forms and codes necessary in the use of the machines. Examples are given of the forms used in taking the data from record books or from the street, the code for getting this data on to the tabulating cards and the forms for summarizing information obtained after it has passed through the sorting and tabulating machines.

Purchasing, Storing and Accounting of Coal for the New York Edison Company.

By Charles R. Lehmann.

The writer gives a summary of the methods employed by the New York Edison Company in the purchase and delivery of its coal. In logical order, he takes up purchasing, transportation, storing, testing, insurance and accounting. Purchasing is described briefly. The company buys coal at the mines and its transportation requires detailed records, all of which are explained. The company's coal-storage plant and its lighting system are given in detail and illustrated by photographs. The way the coal is sampled and tested is also fully described. The various transportation and cost records are explained in detail, copies of many of the forms used being shown.

Additional Submarine Cables Laid for Pittsburgh Central Station.

The Duquesne Light Company, of Pittsburgh, Pa., is laying 12 large, high-tension submarine cables beneath the bed of the Ohio River above the Ohio Connecting Railroad bridge between Brunots Island and Esplen. The laying of these new cables will make possible two separate and distinct transmission routes from the big power plant on Brunots Island and will insure even more perfect service than that which has hitherto existed. The cost of installation will be about $75,000. The back channel of the Ohio River at Esplen is about 850 feet wide. The cables are each 1,285 feet long, weighing approximately twenty pounds per foot and are made in one continuous section to avoid the necessity of submerged joints. Each cable is 4.5 inches in diameter and is made up of three copper wires, each a ½-inch in diameter, and heavily insulated for 13,000 volts. Each cable is capable of carrying 5,000 horsepower, making a total of 60,000 horsepower for the twelve cables. The total weight of the cable is 276,000 pounds. The object of this installation is to provide an outlet for the additional capacity installed and being installed at the Brunots Island power plant. This is the second submarine cable installation to be made at Brunots Island, the first one having been made last December, between the island and the Allegheny shore. These two installations will provide two separate routes, one via Allegheny and Sixth Street Bridge to Pittsburgh proper and the other via West Carson Street and the Point Bridge to the city.

Electric Trucks in New York.

There are 75 different industries in New York City that use electric trucks. Brewers are most largely represented, 19 separate breweries using a total of 34 electric vehicles. The department stores are a close second with 17 owners and 262 individual cars. The seven express companies have altogether 197 storage-battery cars.

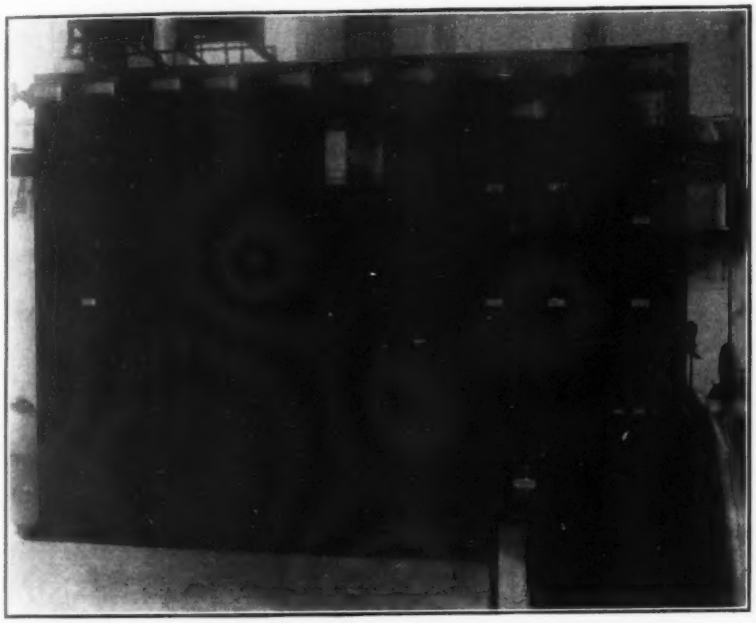
The bakeries come next with eight users of 161 cars, and the two central stations have between them 150 cars. Electric general-delivery wagons number 68 and eight meat-packers together use 67 electrics.

Five jewelers use 44 electric cars and ten wholesale dry goods stores employ 35.

Holstein Starts New Plant.

An example of what can be accomplished in a progressive small town by co-operation is shown by the Holstein Service Company, of Holstein, Iowa, which is now operating a new electric light and power plant.

Holstein is a town of about 1,000 inhabitants situated about 80 miles east of Sioux City. It is a farming center and has but one railroad. Up to the present the lighting has been by acetylene gas from a municipal plant, together with individual gasoline plants. The Holstein Service Company is a corporation composed entirely of local men. It was endeavored to place the stock generally among the townspeople to insure general use of the service and to promote good feeling. There are about 60 stockholders.



Switchboard of Holstein Service Company.

The plant is a brick building adjacent to the city waterworks. The ground floor, which is below the street level, houses the power plant. The second floor is used for the office and show room of the company, with a large space rented to the town for town-hall use. The power equipment consists of two Meitz and Weiss 50-horsepower oil engines belted to 37.5-kilowatt Fort Wayne, three-phase, 2,300-volt alternators. The plant is some distance from the railway and a storage tank is located near the tracks, the fuel being pumped to a smaller tank at the plant by a rotary motor-driven pump. The engines are started by compressed air. A small motor-driven air compressor is provided, which fills a storage tank. A five-panel, black-slate switchboard was built by the Fort Wayne Electric Works for the plant. Two generator panels are provided, an exciter panel with Tirrill regulator, a distributing panel for commercial circuits, and a panel to control the street lamps. The accompanying illustration shows the switchboard.

There are 43 sixty-watt incandescent street lamps located at all crossings, the blocks being 300 feet long. The town is the best illuminated in the vicinity. In the downtown district there are 20 electroliers provided with 40-watt lamps for the side lights and 60-watt lamps for the top light. There are 50 business places in town of which 35 are connected at present. Of the 200 residences, about one-half are connected, and others will be obtained when the acetylene plant is shut down. Service rates are on a sliding scale from 17 cents to 10 cents per kilowatt-hour. Power rates run from 10 cents down. The corner street lights run nightly until midnight and are paid for by the town at $2.00 per month. The electroliers are on a meter basis at 12.5 cents per kilowatt-hour with maintenance furnished by the company.

Twenty-four-hour service is to be started shortly. The power load connected will exceed 50 horsepower; a local elevator, a creamery and a small planing mill being the larger users. Small motors will replace practically every gasoline engine in town. An aggressive campaign will be made for residence day load in irons and miscellaneous home utilities.

Gas oil was used for the engine fuel during the cold weather but fuel oil will be used later. The cost of fuel is about 0.75 cent per kilowatt-hour. The attendant at this plant also operates the town waterworks adjacent, the expense being shared by the town. Co-operation has here materially lessened the cost of the service. A little figuring will make it evident that, although the town is small, a thoroly up-to-date plant will pay well because of the co-operation of all concerned.

At present the period from midnight to morning is a period of loss. It is intended to install a small storage battery and synchronous motor-generator set which will charge during the day and evening runs, and furnish the lighting service for the late night hours at a much lower cost. When this is completed the plant of the Holstein Service Company will be one of the best equipped for a town of its size in the country.

Edison on Low-Priced Electric.

Thomas A. Edison, speaking on general business conditions to a representative of *The Wall Street Journal*, said with reference to his partnership with Henry Ford for the production of a low-price family electric carriage:

"Mr. Ford is making plans for the tools, special machinery, factory buildings, and equipment for the production of this new electric. I have perfected the motors so that an electric machine can be run much more economically than a gasolene car. The machinery has been simplified, every non-essential part eliminated. It will be simplicity itself, so that it can be run by a child. The cost of the car will probably be between $500 and $700. There is so much special work to be done that no date can be fixed now as to when the new electric can be put on the market.

"I believe that ultimately the electric motor will be universally used for trucking in all large cities, and that the electric automobile will be the family carriage of the future. All trucking must come to electricity. With an electric truck, double the load and twice the speed can be obtained with half the space.

"The success I have achieved in any line, I attribute to constant work on one thing until it is perfected. This does not mean that I keep only one iron in the fire. Up to the present I have obtained over 1,200 patents from the United States Patent Office, and a very large number in foreign countries. But I have worked on the principle of keeping at it until I produced the desired result."

A new district office and showroom was opened to the public by The New York Edison Company, on May 27, at Irving Place and Fifteenth Street. This office will transact all business for the district between Eighth and Twenty-eighth Streets.

Electrical Decorations for Shriners' Meeting in Atlanta.

The annual meeting of the Imperial Council of the Ancient Order of the Mystic Shrine was held in Atlanta, Ga., from May 11 to 16. One of the noteworthy features of this assembly was the very liberal use of electrical decorations, which were for the most part adapted to the "White Way" tungsten-cluster posts along the principal streets.

One of the designs is shown in Fig. 1; 137 of these designs were installed along Mitchell, Whitehall, Peachtree and Luckie Streets. The special design mounted on top of the post extended six feet above the level of the arms and was two and one-half feet wide. The camel shown in the center of the inclosure was 14 inches high. Most of the decorative design was made out of sheet iron painted white, with the Shriners' emblem in appropriate colors. The illustration in Fig. 1 was made from a drawing and not a photograph. In the actual carrying out of the design, the top globe was first removed and the ornamental housing mounted on top of the globe-holder. The top lamp, therefore, illuminated the entire interior of the housing, giving it a very ornate effect.

With the design shown in Fig. 2, 80 posts were equipped along Marietta and North Pryor Streets. In this case the lamps were removed and the emblems, which had been molded from special composition material and painted white, were supported on metal bases painted a green color. The large crescent in the center was 36 inches high and the smaller crescents were mounted on each of the four arms of the post. From the center of the top crescent was hung a 500-watt frosted lamp; in the center of the star of each of the smaller emblems was a 25-watt tubular frosted lamp. All of these lamps were fed from the regular post-lighting circuits.

Two other designs were also used on posts along Broad and Forsyth Streets, about 90 posts being equipped with them. At each of 25 four-way street crossings a four-foot double-faced Shrine emblem was mounted by span wires across the street. This was illuminated by 50 lamps. At the intersection known as the "Five Points," a large 15-foot star studded with 300 lamps on each side was mounted. The center was illuminated by lamps of various colors suitable for the Shrine color scheme. The entire design was mounted 50 feet above the street and from the lower portion of the design festoons of electric lamps were strung to the White Way posts at each of the street corners, giving a canopy effect. In these streamers and the center design 1,500 lamps were used.

Fig. 1.—Decorated Lamppost.

From this five-point intersection to the Masonic Temple, three 36-inch double-faced metal Shrine emblems were suspended on each trolley span. Each of these was illuminated by 40 eight-candlepower lamps. At intervals large stars with a 500-watt lamp at the center were suspended at each side of the street from a wire span connected to the trolley poles.

At the Masonic Temple there was installed a large Shrine emblem about 20 feet square. This was illuminated by 1,060 lamps, those in the star of the emblem being red and in the other parts of colors corresponding to the Shrine colors. This emblem was mounted 110 feet above the ground and could be seen from nearly all parts of the city. Special lighting was also provided on many of the club and hotel buildings. All of the lighting was installed by the McGaughey Electric Company, of Atlanta. Carroll B. McGaughey, of this firm, was chairman of the Committee on Arrangements.

Fig. 2.—Another Example of the Decorations.

College Students Design Complete Electric Power Plant.

Complete plans and specifications for the construction of a monster electric power plant at Hazard, in Perry County, Ky., await the promoter or the contractor who will undertake such an improvement in that part of the southeastern Kentucky coal field. These plans are to be found in the archives of the Mechanical College of the Kentucky State University at Lexington. They have just been completed and constituted the thesis work of this year's graduating class at that school.

Altogether there are about 100 blue prints and drawings and several hundred typewritten pages of specifications. The work was done by the students under the direction of Professor Anderson, who devised and superintended the execution of this unique educational plan. It is one of the first instances on record in which a technical college has required that sort of work from its senior students. Though the plans are largely theoretical, of course, they apply to a concrete situation and are capable of being carried out in all details.

The actual work on the plans was preceded by a trip to Hazard, in the center of a large and rich coal-mining field in which territory electricity for power is coming more and more into demand with the mine operators. On the ground the students made a selection of the site for the plant, surveyed it and staked it out, working under the direction of Professor Anderson. Then, with the requirement fixed in their minds and reduced to drawings, the students returned to Lexington where they began working out the solutions of the problem. The details as to the horsepower which could be realized by construction of a plant, according to the plans of the students, are not available at this time. In a general way, however, the generating power would come from steam, coal, plentiful and cheap, to be the fuel.

Eastern Kentucky is developing at a very rapid rate and it would not be in the least surprising if before long the plans of the students would be used.

NOTE ON PROPOSED SPECIFICATION FOR WAVE FORM.

By T. T. Fitch.

In order to limit the percentage of permissible harmonics in the wave form of commercial alternators, it has recently been proposed as a specification for the Standardization Rules of the American Institute of Electrical Engineers that the current drawn by a condenser shall not be more than 10 per cent in excess of that for a sine wave. The rule is a very simple one, but its practical application involves the use of instruments and these may introduce a serious error in the result.

The writer has, therefore, tested the proposed rule on two wave forms in commercial use, first with a Hartmann and Braun hot-wire ammeter, and second, with a Weston moving-iron ammeter, both of one-ampere range. The moving-iron instrument has an inductance of 2.35 millihenries, while that of the hot-wire instrument is negligible, being no more than that of a straight piece of wire 15 centimeters in length. The test was made at 125 volts, 61 cycles, using a condenser of 9.94 microfarads.

The computed value for a sine wave was 0.476 ampere.

The following results were obtained:

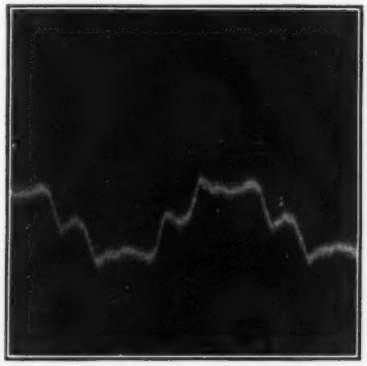
Generator No.	Ammeter	Observed Amperes
1	Hot-Wire	0.493
1	Moving-Iron	0.514
2	Hot-Wire	0.548
3	Moving-Iron	0.738

Oscillograms were taken of the voltage and current waves in each case, which are shown in the accompanying figures. The current for the oscillograph was taken from a 0.5-ohm shunt placed in series with the condenser.

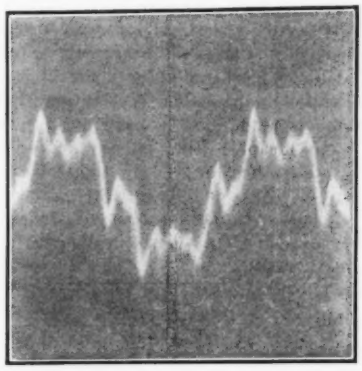
It is seen by reference to the table that there is considerable increase of current when using the inductive ammeter, this increase in fact amounting to 35 per cent in the case of generator No. 2. The oscillograms in this case indicate the presence of considerable thirteenth harmonic, though no analysis has been made. The increase of current is of the right order of magnitude to be explained by the inductance of the moving-iron ammeter, as may be seen by the following theoretical case. Take 125 volts at 60 cycles having 4 per cent of the thirteenth harmonic present. The current drawn by 10 microfarads with negligible resistance and inductance would be 0.521 ampere. By the addition of 2.35 millihenries of inductance in series with the condenser with the other conditions the same, the current would be 0.735 ampere. In the case of the experimental results given in the table, the errors are not due to failure of the moving-iron ammeter to indicate correctly the current passing through it, as tests at 600 cycles, as well as tests on distorted wave form, show ammeters of this type to be little in error.

Evidently the proposed specification should have a note appended stating that the ammeter used must be of negligible inductance and that practically the only such instruments now available are those of the hot-wire type.

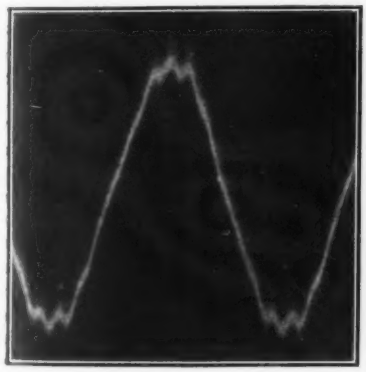
Generator No. 1—Voltage Curve.



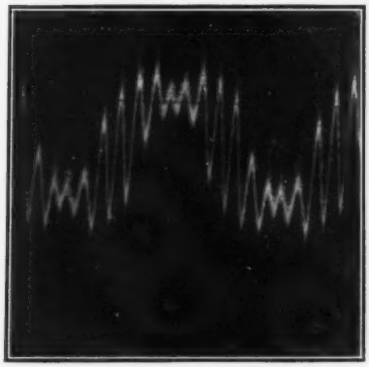
Current Curve, Hot-Wire Ammeter.



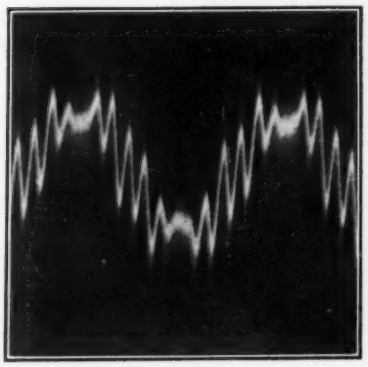
Current Curve, Moving-Coil Ammeter.



Generator No. 2—Voltage Curve.



Current Curve, Hot-Wire Ammeter.



Current Curve, Moving-Coil Ammeter.

New Submarine Cable from New York to Panama.

It has been announced by James A. Scrymser, president of the Mexican Telegraph Company and of the Central & South American Telegraph Company, that a second cable would be laid this summer from New York City to Colon on the Isthmus of Panama.

Increase in Central and South American trade has taxed the existing cable, and with the opening of the Panama Canal the increased business will be of such volume that it could not be taken care of without an extension of the existing facilities. Work on the laying of the new cable will be started at once and will be completed by the end of November.

BOOK REVIEWS.

"Investigating An Industry." By William Kent. New York: John Wiley & Sons, Incorporated. Cloth, 126 pages (5x7¼inches). Supplied by the Electrical Review Publishing Company, Inc., for $1.00.

This book is a reprint with slight alterations of a series of articles which appeared in *Industrial Engineering* last year. It deals with the application of the principles of scientific management to industrial problems, covering not only factory management but the selling force as well. The inclusion of the latter feature appeals to the reviewer as the most important feature of the book. The book is written in narrative form and puts forth the author's ideas in the form of application to a definite hypothetical case. After showing how an investigator goes about getting the desired information in a particular industry, he presents a report showing how the business should be organized and conducted. He emphasizes the desirability of a board of directors being what its name indicates rather than a mere stockholders' committee having power without responsibility. There is an introduction written by Henry L. Gantt and an appendix dealing with the "leak hunter," an individual whose duty it is to study the general problem of what things in a factory need to be improved and how to improve them.

"Camp Co-operation Book of Proceedings." East Aurora, N. Y.: The Roycrofters. Leather, 250 pages (6¼ x 9¼ inches), illustrated. Single copies, $1.25; 25 copies or more, $1.00 each. Paper binding, single copies, 50 cents; 25 copies or more, 40 cents each.

The book of proceedings of the Co-Operative Meeting held under the auspices of the Association Island Corporation at Henderson Harbor, N. Y., on September 3 to 6, 1913, has been published. The volume contains a very interesting introductory and notable addresses by J. B. McCall, president of the Philadelphia Electric Company and president of the National Electric Light Association; Anson W. Burchard, vice-president of the General Electric Company; Elbert Hubbard, S. O. Richardson, Jr., president of Association Island Corporation; Frank W. Smith, vice-president United Electric Light & Power Company; Norman Macbeth; Samuel Insull, president Commonwealth Edison Company; Dr. Thomas Darlington, Frank A. Vanderlip, Dr. Charles P. Steinmetz, Willard Howland, F. E. Watts, W. E. Robertson, J. M. Wakeman, F. P. Fish, E. McCleary, D. L. Gaskill, J. Robert Crouse and John H. Roemer. The book is illustrated with half-tone reproductions of the portraits of many of the prominent men of the industry, and with smaller illustrations depicting some of the scenes during the convention session at Association Island. A very interesting feature is a gravure of Thomas A. Edison and a copy of a personally autographed letter which was received by each person participating in the meeting. The book is a very handsome example of composition, printing and book binding.

"Elementary Magnetism and Electricity." By Cyril M. Jansky. New York: McGraw-Hill Book Company, Inc. Cloth, 212 pages (6x9 inches), illustrated. Supplied by the Electrical Review Publishing Company, Inc., for $1.50.

This volume was prepared in the Extension Division of the University of Wisconsin, for use in correspondence courses. It will be of value to non-technically trained men who have had some practical experience with electrical apparatus or machinery. It is intended for individual or home study and the apparatus required for the experiments is inexpensive and most of it can easily be made by an ingenious student. The book, however, is well adapted for class work in industrial schools. There are 10 chapters with the following headings: Magnetism, Electromagnetism, Some Practical Applications of Electromagnets, Electromagnetic Induction, Current Electricity, Electrolysis, Resistance, Flow of Current in a Circuit Electric Generator and Motor, and Work and Energy. Electrostatics has been intentionally omitted. It is written in a semipopular conversational style, and although it contains numerous mathematical formulas, they are comparatively simple and can easily be understood by one having a common-school education.

"Electric Light Accounts and Their Significance." By H. M. Edwards. New York: McGraw-Hill Book Company, Incorporated. Flexible leather, 172 pages (5x7½ inches). Supplied by the Electrical Review Publishing Company, Inc., for $2.00.

The author of this volume is the auditor for the New York Edison Company, and has consequently been in close touch with the subject with which he deals. The system which he presents, however, is not exactly the same in detail as that followed by the company named and it differs also in some respects from the system adopted by the National Electric Light Association. The book is divided into three parts, the first dealing with balance sheet indicant accounts, the second with income accounts and the third with miscellaneous matters. A complete list of the necessary accounts is given and the text is devoted largely to explaining their significance and how they should be handled. One chapter is given over to the symbols used in designating accounts, for which the author favors the decimal system. The book should prove of interest and value to any one connected with the accounting of an electric lighting company. It is well printed and attractively bound.

Meeting of the Society for Electrical Development.

The Society for Electrical Development, Incorporated, held a meeting in the Bellevue-Stratford Hotel, Philadelphia, Pa., on Monday, June 1. J. M. Wakeman, general manager, reported that the $200,000 required to start the Society in its permanent activities has been pledged and that the best talent available for pursuing the work of electrical development has been secured. The work will be divided into four sections: field co-operation, new development, publicity and advertising, and commercial exchange bureau. Robert N. Lee has been engaged to assist the man, not yet selected, who will manage the work in field co-operation. John P. Mallett has been engaged to investigate the present uses of electrical energy and determine how its applications can be extended. Theodore Dwight will have charge of the commercial exchange bureau. H. C. Spalding will have charge of the publicity and advertising department.

The Society has established a department in charge of L. G. Harkness-Smith for arranging and photographing on motion-picture films, scenarios illustrating the uses of electricity in the home, office, factory and farm. A window-trimming department has been organized under the direction of A. J. Edgell.

James Smieton, Jr., read his report as acting treasurer. It was decided to change the fiscal year to end April 30.

The following new members of the Board of Directors were elected to serve four years: J. E. Montague, Buffalo, N. Y.; H. B. Crouse, Syracuse, N. Y.; F. Bissell, Toledo, O.; G. M. Sanborn, Indianapolis, Ind.

A meeting of the Board of Directors followed, at which a resolution was adopted stating that the Society's efforts shall be devoted to developing the use of electrical energy by the general public, leaving the question of defining the channels through which and the methods by which the increased market shall be reached to experience and local co-operation.

The following officers were elected to serve for the ensuing year: president, Henry L. Doherty; first vice-president, W. H. Johnson; second vice-president, A. W. Burchard; third vice-president, W. E. Robertson; fourth vice-president, J. R. Crouse; fifth vice-president, Ernest Freeman; general manager, J. M. Wakeman; acting secretary-treasurer, James Smieton, Jr. The following were elected to serve as the executive committee during the ensuing year: H. L. Doherty, Ernest Freeman, A. W. Burchard, J. R. Strong, Gerard Swope, L. A. Osborne, W. E. Robertson, J. R. Crouse and W. H. Johnson, chairman.

Electrical Construction

ELECTRICAL INSTALLATION FOR CHILD'S RESTAURANT, LOUISVILLE.

By F. F. Valinoti.

This is the second installment of a report of progress in the installation of the lighting and power equipment of Child's restaurant, in Louisville, Ky. This installment covers the lighting of the basement and the entrance of the service wires.

Fig. 3 shows plan of basement. All outlets are for cord drops. In this case, as on the first floor, we tried to keep down the number of conduits, and also make the runs look as neat as possible. The ceiling is not plastered and, with the exception of the toilets, will not be. The joists in the basement run across the building, and the I-beams longitudinally. No ells were permitted on the flat work; only where we went up between the joists were we allowed to use them. The conduits were run exactly as shown on plan. The conduit marked "Up" on the north wall near service entrance carried the circuit which will feed eleven drops under the vent gallery on first floor. The conduit marked "Up" near lift goes to the top of lift shaft, and out to a bracket in alley over entrance to lift. This bracket is controlled by a switch on wall near lift. Flexible conduit was used for the three bracket-fan outlets on first floor. This was fished down the pilasters (which had been furred out) and into the outlet boxes shown, in conduit run along south wall of basement. The conduit marked "Up" on south wall in toilet room carries the circuit which feeds the outlets on the ceiling of balcony on first floor. A three-quarter-inch conduit carrying three circuits runs from the cabinet down and over in the basement as shown, and feeds the Marquise in front of building. This Marquise has receptacles (one on each corner) which are enclosed in large balls, and are controlled on one circuit. The balance, 48 in number, are wired alternately, and are controlled on two circuits.

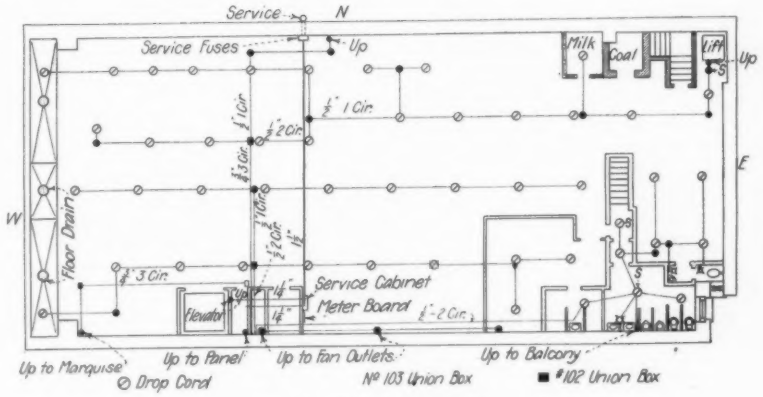


Fig. 3.—Plan of Basement.

As almost the entire north wall will be used for tables, machines, etc., it was impossible for us to place our service cabinet at the point of entrance. The service wires were brought in as shown in Fig. 5, the entrance fuses being placed in an iron cabinet, as close to the ceiling as possible. From this a 1.5-inch conduit was taken across the building, up between the joists, and then down to the service cabinet, shown in Fig. 4. This conduit carries three No. 0 wires. Two main switches were placed in the cabinet, one 100-ampere, three-pole fused switch for the Childs Company, and one 60-ampere, three-pole fused switch for the upper floors. From the 100-ampere switch three No. 2 wires were taken through a 1.25-inch conduit to the distribution cabinet on first floor. From the 60-ampere switch three No. 6 wires were taken up through a 1.25-inch conduit to

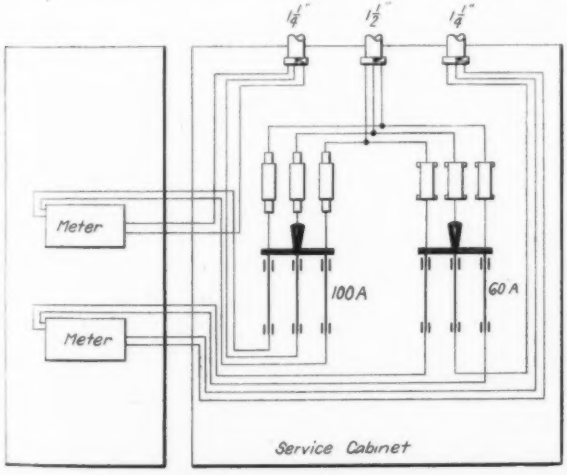


Fig. 4.—Service Cabinet.

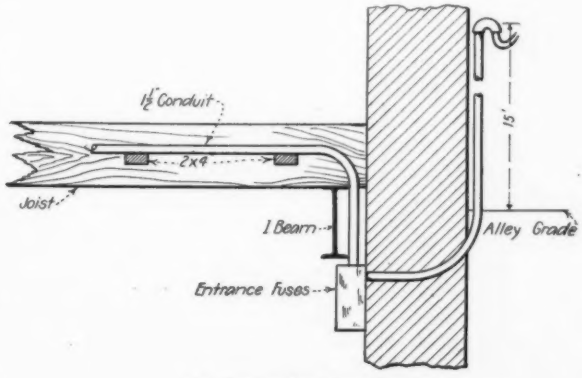


Fig. 5.—Service Entrance.

the second, third and fourth floor panels. These floors will be occupied by other parties.

In the distribution cabinet, on the first floor, is mounted a three-to-two-wire Frank Idam panelboard with N. E. C. S. fused branch switches, lugs only on man bars. This panel will have a German-silver trim, which will be furnished by the W. D. Lewis Company, of New York, general contractors.

All the wire for the entire lighting installation has been pulled and connected to panel.

The drops in the basement have also been installed. They were made up of slicked braid No. 18 reinforced cord, Pass & Seymour porcelain key sockets, and No. 1172 porcelain outlet-box covers. The same was used on the drops under vent gallery on first floor, except the cord which, in this case, was white twisted-silk lamp-cord.

This completes the lighting, with the exception of the indirect fixtures and ceiling fans, which we are to hang as soon as they arrive.

We are now starting on the power wiring, which will be described in the next installment.

Meeting of the Electrical Contractors of Ohio.

An enthusiastic, aggressive and perspiring group of men, members of the Electrical Contractors' Association of Ohio, met in annual convention, May 27 and 28, in the Banquet Hall of the Hotel Euclid in Cleveland, O., to carry out what proved to be the most entertaining and instructive program yet arranged. Promptly at 10:00 a. m. on Wednesday the meeting was called to order by Past-president Partick McNerney, of Cleveland, in the absence of President Charles Aull, of Cincinnati, who was detained in Columbus at a hearing before the Utilities Commission.

George A. Rutherford, president of the Builders' Exchange, gave a welcome address in his characteristic style. Mr. Rutherford is of genial manner and pleasing personality and immediately won the hearts of his hearers, who enthusiastically cheered his remarks.

He was followed by S. E. Doane, chief engineer of the National Lamp Works of the General Electric Company, who spoke on "Observations on European Contractors, Construction and Conditions." It was a very instructive and interesting comparison of European and American conditions in the electrical field. Mr. Doane showed the advancement made in wire-making and electrical engineering, which enabled the small householder to have the benefits of electric light. He pointed out that the houses were mostly of stone or brick and that the plastering was done on the walls of the houses, and the wiring was incased in the plaster. The wire is of excellent copper and insulated with pure soft rubber, the whole being incased in a copper or brass flexible jacket, which is used in place of the two-wire circuit, the metal jacket taking the place of one wire and the peculiar installation making a continual ground on one side of the line. This arrangement, in connection with a circuit-breaker in place of a meter, enabled the central station to give a flat rate that came within the means of the poorest family. He pointed out how, in an investigation of the books of three hundred American illuminating companies, the meter service, including the billing, cost on the average from $7.50 to $15 per year, showing that a customer who bought less than $1.25 worth of energy was carried at a loss and that therefore our companies did not cater to the small consumer but rather to the larger one. His observation showed the reverse to be true in the old country and that under their system the solicitation for business after from three to five years of their plan was discontinued, for their applications for service after that time were in excess of their ability to care for them.

General discussion on the above brought out many interesting points in detail and all were agreed that they were abundantly repaid for being present. A recess and dinner found a continuation in the program by addresses by G. W. Hill, representative of the National Electrical Contractors' Association on "Uniform Accounting" and by Ernest McCleary, of Detroit, Mich., on "National Code." Both addresses were full of interest and well received.

The first day was concluded with an automobile ride through the parks and boulevards, an inspection of Nela Park and an elaborate menu at the famous Hofbrau.

With the exception of a talk by Harry C. Turnock, on "Overhead Expense," the second day was given over to business, election of officers, etc. The old officers were re-elected. An adjournment was taken at 12:30 p. m. and the invitation of the Electric League, Jovian Chapter, of Cleveland, to dinner was accepted, after which all adjourned to the Electrical Exposition, where the contractors proceeded to enjoy themselves in becoming acquainted with the show.

The Gold Chain Mining Company's officials at Eureka, Utah, have placed an order for an electrically driven hoisting equipment for the operation of their mine, and expect to have the new machinery in working order within sixty days. The officers report that the installation of this electric hoist will effect a material reduction in the cost of operating over the present steam hoist now in use and will enable them to materially increase the output of the mine.

Meeting of Indiana Contractors.

The annual meeting of the Electrical Contractors' Association of Indiana, was held in the Palm Room of the Claypool Hotel, Indianapolis, Ind., on May 28 and 29. The meeting was called to order by President M. K. Foxworthy at 10.00 a. m. on Thursday, May 28, in a closed session with 11 members present. Following the roll call and the reports of the officers, the report of the By-Law Committee was presented by G. M. Sanborn, chairman, that of the Membership Committee, by A. L. Swanson, chairman, and that of the Finance Committee, by David Heimann, Jr., chairman. After a discussion of various miscellaneous business, the convention adjourned until 2:00 p. m.

The first paper to be presented at the afternoon session was one by J. E. Latta, of the Underwriters' Laboratories, on the subject, "Underwriters' Attitude." Mr. Latta called attention to the fact that although both the Underwriters' Laboratories and the various underwriters' bureaus have as their primary object the reduction of fire hazard, the Laboratories merely conduct tests and approve devices in accordance with the rules formulated by the National Fire Protection Association, while the various underwriters' bureaus are either rate-making or inspection bureaus. Mentioning the National Electrical Code, Mr. Latta said that the same is revised every two years by the Electrical Committee of the National Fire Protection Association sitting for that purpose in New York City. Before any changes in the Code are adopted, the meeting is opened to all that are interested in its revision, thus giving electrical contractors and other interests a voice in the making of the Code. All legimate contractors should consider it their duty, therefore, to see that the Code is promulgated into the smaller towns. Mr. Latta then showed a sample of a poor grade of old-code wire, which was found on sale in the Middle West. Showing, the poor quality of the insulation, he appealed to the members of the Association to aid the Laboratories in its efforts to abolish the use and the sale of this wire in the small towns of Indiana. In conclusion, Mr. Latta said that the Underwriters' Laboratories aim to lead and serve, rather than to force and drive.

A. L. Swanson, of Evansville, Ind., then asked Mr. Latta to explain how the Underwriters' Laboratories obtained its revenue. In reply, Mr. Latta, said that the Laboratories is incorporated under the laws of Illinois, there being a provision in its charter that prohibits the making of a profit. The buildings have been donated to the

Laboratories by insurance and other interests, while the expense of conducting the Laboratories' work is defrayed by the fees charged for testing and label service. In the case of the label service, the difference between the revenue derived from the labels and the actual expense of the service, is adjusted yearly between the Laboratories and the various manufacturers.

Others entering into the discussion were G. W. Hill, G. M. Sanborn, and D. Heimann, Jr.

C. C. Perry, of the Indianapolis Light & Heat Company, then talked informally on the attitude of central stations towards electrical contractors. He stated that the Indianapolis Light & Heat Company realized in about 1890, that the electrical contracting business was not a proper field for its activities. The company has, therefore, given the electrical contractor its hearty co-operation.

G. M. Sanborn verified Mr. Perry's remarks and stated that the company is expected to soon agree to discontinue selling lamps and motors.

A. J. Douglas, of the Merchants Heat & Light Company, of Indianapolis, then made a few remarks on the co-operation existing between that company and the electrical contractors of Indianapolis.

C. E. Roberts, of the Western Electric Company, made a few remarks on the subject of co-operation between manufacturers and contractors.

H. A. Roberson, of the Electric Service Company, of Evansville, talked on the subject of confidence in electrical contracting. Mr. Roberson stated that every contractor should have confidence in himself and in his fellow contractors, refusing to accept as true stories that may be circulated about legitimate competitors.

M. D. Cooper, of the National Lamp Works, Cleveland, O., then presented a paper entitled "The Electrical Contractor and Lighting Service." Considering first the importance of operating incandescent lamps at the voltages specified on the labels, he slowly led up to the subject of voltage drop, showing that the contractor loses in an installation where the drop is excessive because of the decreased amount of copper used, that the owner of the installation loses because of the uneconomical operation of lamps and heating devices, and that the central station loses because of the decreased wattage consumption. His paper concluded with a number of tables showing actual and average voltage drops for industrial, residence and commercial service, and a table giving the relation between size and length of wire and voltage drop. He also called attention to the importance of operating heating devices and the higher-wattage lamps at proper voltages.

The meeting was then thrown open to miscellaneous discussions. W. I. Stone of the Indiana, Inspection Bureau told of the efforts being made to abolish old code wire, the inspection bureau having the matter well underway, but requiring the co-operation of contractors and central stations. Much can be accomplished in this direction, he said, if central stations will refuse to supply power to installations wired with old-code wire.

D. Heimann, Jr., of Evansville, then made a few remarks about wiring practices in Evansville emphasizing the need for a city ordinance licensing electricians and contractors and requesting information regarding such ordinances in other cities.

G. W. Hill, special representative of the National Association of Electrical Contractors said that many cities had such ordinances, and that the National Association would aid and advise the contractors of any city or town in the enactment of wiring ordinances and ordinances covering the licensing of those engaged in electric-wiring and contracting business.

Friday's Sessions.

The morning session on Friday, May 29, was a closed session in which various miscellaneous business was discussed. At this session Ernest Freeman, of Chicago, Ill., president of the National Association, delivered a very interesting paper entitled, "Suggestions to State Associations." His first suggestion called attention to the advantages to be derived by holding frequent meetings and by co-operating and exchanging ideas. Mr. Freeman stated that he attributed much of his success to the state and national contractors' associations, saying that one can easily derive a return of five to one for every dollar invested in such associations. His next suggestion was that of improving one's credit. Much larger and more successful business can be conducted if a contractor improves his credit. To improve one's credit, Mr. Freeman said, that one should first make himself worthy of obtaining credit and second that he should conduct his business along modern standards. State organizations, he said, can do much in the way of improving credit conditions. His next suggestion was that state associations assume the duty of obtaining license laws in various municipalities. His fourth suggestion was that state associations put forth efforts to obtain uniform and reasonable liability-insurance rates. Mr. Freeman suggested that a special representative be employed for this purpose, his compensation being fully covered by the decrease in liability rates that he is able to perfect. This representative, he stated, could also be employed in educational work. His fifth suggestion recommended that state associations appoint supply committees whose object should be to forbid supply dealers and contractors from selling small quantities of wiring devices at almost wholesale prices. Mr. Freeman's last suggestion was on the subject of co-operation. In this connection he recommended that state associations and individual contractors co-operate with central stations in a very extensive manner.

George W. Hill, special representative of the National Association, told of the educational work that is being done by the National Association. He advocated the adoption of the National Electrical Conractors' Association's booking keeping system by all contractors. The Universal Sales and Data Book, he said, should prove of immense value to all, and its use ought to become national. In concluding his address, he emphasized the value of membership in the National Association.

The report of the Legislative Committee was also presented at this session. This report, which was adopted, recommended that efforts be made to obtain local laws governing the licensing of contractors, before atempting to obtain a state law.

At this session the present officers, namely: President M. K. Foxworthy, of Indianapolis; Vice-President, A. L. Swanson, of Evansville; Secretary, G. L. Skillman, of Indianapolis; and Treasurer, F. L. Meier, of Indianapolis, were re-elected to their respective positions.

The afternoon session opened with an address by H. H. Cudmore, of Cleveland, O., his subject being "The Society for Electrical Development." Mr. Cudmore stated that the working organization of the Society had been perfected. The board of directors includes four electrical contractors one of whom is Ernest Freeman, president of the National Electrical Contractors' Association, four electrical jobbers, four electrical manufacturers, and four members at large. There are now about 1,400 members in this society, of which Mr. Cudmore estimates about 500 are electrical contractors. The society is co-operating with national, state and local electrical societies and aims to have a representative at every electrical convention. Mr. Cudmore stated that the Society's plans may be grouped under four headings, namely, (1) Field Co-operation, (2) New Development, (3) Commercial Exchange Bureau, and (4) Editorial and Advertising. The editorial and advertising features of the Society's work, he said, should prove of great value to

the contractor in that this department will provide advertising copy service, plans for window trimming and will educate the public in the use of electrical devices and their conveniences by means of well-written magazine stories and numerous motion-picture films.

E. Freeman, of Chicago and G. L. Skillman, of Indianapolis made a few remarks in which they called attention to the co-operation afforded by membership in this society.

The next paper was by T. A. Wynne, of Indianapolis, on the subject, "Jovianism." In the absence of Mr. Wynne, the secretary, G. L. Skillman, read the paper. Mr. Wynne's paper called attention to the advantages that can be derived by including in its membership men who are not directly interested in the electrical business. Such co-operation, Mr. Wynne holds, will do much to educate the general public in electrical matters. Co-operation between public utilities and the Jovians was strongly urged as being of benefit to both parties, as is shown by the co-operation and good will existing between these parties in Toledo, O.

H. H. Madgsick, of the National Lamps Works, Cleveland, O., then delivered a short address on the development of tungsten-filament lamps. The two recent developments of concentrated filaments and gas-filled lamps were considered. He called attention to the adaptability of the spiral filament to tube lighting, searchlight and projection lanterns, and to miniature lamps. The gas-filled lamps, he said, are well adapted for flood lighting, display lighting, and photographic work. Another important development, he said, was that of the prismatic reflecting globe which enables the light to be concentrated in desired regions. Considering, the theoretical details of the lamps, he showed that there was no upper limit of candlepower for these lamps, but that small high-voltage units are deemed impossible under the present conditions.

G. M. Sanborn, of Indianapolis, then gave a short talk on pitfalls in estimating a contract. Every successful contractor, he said, aims to estimate not on all work, but only on such work as he believes will benefit him and his business. A knowledge of when not to estimate, he deems of equal importance to a knowledge of when to estimate. He believes that it will pay every contractor to make a careful analysis of every contract before estimating and not after being awarded the contract. He also emphasized the necessity of keeping account of labor expenses. Experience is all that is necessary to permit a contractor to make an intelligent estimate on labor expense, and the sooner one obtains that experience by proper methods of cost keeping, the sooner he will be able to estimate his labor expense quite intelligently.

G. E. Varney, of the Varney Electric Supply Company, Indianapolis, made the concluding address. Mr. Varney stated that the electrical jobber of today is more a distributer and service man than a jobber, in that he conducts both a wholesale and retail business. He emphasized the necessity of every field of the electrical industry maintaining its identity and refusing to encroach on other fields. A jobber, he said, should not engage in a contracting business and a manufacturer should not engage in a jobbing business. The jobber is the proper middleman between the manufacturer and the contractor, and for this reason the contractor should support the jobber. Mr. Varney regrets the fact that many jobbers seek to do business in other towns than their own. Such methods he said can do no one any good.

In the evening the members of the association and their guests were the guests of the Indianapolis Electric Club at a boxing bout at the Federal League Park.

The following were present at the convention: F. H. Cheyne, C. A. Evans, M. K. Foxworthy, T. B. Hatfield, D. Heimann, Jr., F. L. Meier, B. H. Reid, G. M. Sanborn, R. Sieffert, G. L. Skillman, and A. L. Swanson.

Among the Contractors.

Russell H. Eddy, of St. Paul, Minn., recently secured a contract of the kind that is good to the heart of the electrical contractor. It was for wiring a high-class residence, and the owner specified that Mr. Eddy was to do the work, subject to the supervision of the architect. The plans include underground feeds to the house and to the garage, with conduit used throughout. A very complete system of lighting is provided for, including gate posterns. There are also burglar alarms, telephones and bells. The garage is to be equipped for charging an electric vehicle. Outlets will be provided for a washing machine, vacuum cleaner, flatirons, fans, electric table devices, and bed blankets on the sleeping porch. One feature of the burglar-alarm system will be four 100-watt lamps under the eaves, so that the yard will be lighted on all sides of the house when the alarm is set off. This is one of four houses which Mr. Eddy has secured this season on Summit Avenue, one of the fashionable residence streets of St. Paul.

The Terrell-Hedges Company, of Chattanooga, Tenn., is installing the apparatus for the electrical control and operation of the gates at Hale's Bar lock on the Tennessee River, where the big hydro-electric power plant has been in operation for some time. The contract was let to the Terrell-Hedges Company several weeks ago by the Government.

Bailey & Reynolds, of Kansas City, Mo., were liberal advertisers in special editions of Topeka papers issued in connection with the dedication of the new G. A. R. Memorial Hall at the Kansas capital. The Kansas City concern provided and installed the electrical fixtures in the $50,000 structure.

The Des Moines Electric Contracting Company, of Des Moines, Iowa, has completed the installation of a 150-horsepower, three-phase motor for the Des Moines Clay Manufacturing Company to be used in the new addition to its brick-making plant. Another recent installation was that in the Des Moines Saw Mill, which included nine motors, varying in size from 1 to 50 horsepower.

LETTER TO THE EDITOR.

Percentage System in Electrical Contracting.

To the Editor:

While it is extremely doubtful that the percentage system will ever entirely replace the present method of hard-and-fast estimating for work, at the same time, speaking from experience, in certain cases and under well defined conditions, it has undoubtedly much to recommend it. A *sine qua non* is, however, the confidence of the customer, without which many irritating points will come up for discussion, more or less heated, at the final adjustment of the account.

If a clear understanding can be arrived at, at the beginning, as to the fundamental charges, material, labor and sundries, plus an agreed profit, including overhead charges and supervision, there is no reason why the transaction should not be mutually satisfactory.

No reasonable customer, and it is a wise policy to assume that all customers are reasonable, or will be, if handled judiciously, will expect to participate in any special discounts for cash payments, etc., made by the contractor.

Nothing is more calculated to impress a potential client who is approached with a view of securing an order on the percentage plan, than a frank statement that the contractor is willing to have the items making up the cost audited and to produce all vouchers called for.

H. Bell.

Englewood, N. J., May 25, 1914.

National Association of Electrical Inspectors.

THOMAS HENRY DAY, President, 59 Deerfield Street, Hartford, Conn.
H. S. WYNKOOP, Vice-President, 13 Park Row, New York, N. Y.
WILLIAM LINCOLN SMITH, Secretary and Treasurer, Concord, Mass.
JAMES E. COLE, Representative on Electrical Committee of National Fire Protection Association, 11 Wareham Street, Boston, Mass.

Executive Committee
EUGENE N. DAVIS, Chairman, Brookline, Mass.

SECTION REPRESENTATIVES:
C. H. Fletcher, H. Burnes, British Columbia.
A. W. Hopkins, G. W. Perry, Western New England.
Washington Devereux, A. H. Engle, Philadelphia.
E. N. Davis, H. A. Knight, Eastern Massachusetts.
C. A. Hannan, O. E. Smith, New York City.

MEMBERS AT LARGE:
George L. Collison, Frank R. Daniel, James H. Fenton, F. G. Hartwell, J. E. Latta, James B. McCarthy, Thomas D. McColl, C. W. Mitchell, A. A. Moffitt, R. P. Strong

"LET THE CODE DECIDE."

Secretary's Message.

The secretary is pleased to announce that the full vote of the Executive Committee has been cast in favor of the admission of the California Association of Electrical Inspectors, as a section of the National Association. The new section has as secretary John W Carrell, 55 Fulton Street, San Francisco and our present member, C. W. Mitchell, as its president. These two gentlemen have been chosen to represent the section upon the Executive Committee. The section starts off with 19 members, of whom one was already with us.

The Secretary regrets to announce that Executive Committee Member Thomas D. MacColl has retired from the position of inside inspector of Toledo, O. The city loses so far as the Secretary can judge from his relations with Mr. MacColl, a very efficient and highly trained officer. Since the Secretary assumed this office, Mr. MacColl has never failed in answering the question bulletins, and the Secretary thinks the other members of the Committee will agree that his answers have been invariably characterized by a very accurate conception of the meaning and application of the Code as regards both its letter and its spirit. The Secretary is pleased to say that for the present Mr. MacColl under our constitution can, and he trusts will, remain on the Executive Committee, and feels confident that he will prove in the future, as in the past, one of its most valuable and conscientious members. Mr. MacColl's future address is Walova Road, Wildwood, Toledo, O.

The Secretary particularly requests that the members report to him any cases which come to their attention where old-code wire is detected with all the facts of the case in detail. In certain sections it is unquestionably being used to some extent. The Laboratories will supply any inspector with tags on request, and the Secretary urges all members to utilize this service for the testing of doubtful wire, remembering to use particular care to get as complete data as possible and all tags, labels, etc., that come or are found with the wire in question. Remember too that the forwarding of *good* wire with labels, etc., is equally of value.

The matter appearing in this section consists of questions on the National Electrical Code, its interpretation and meaning, and questions as to whether certain methods of wiring are in accord therewith. These questions are gladly received from anyone interested, even if not a member; they should be sent to the secretary with any needed elucidating sketch. They are answered by each member of the Executive Committee according to his knowledge of what the ruling would be in his jurisdiction.

It should be understood that no pretense is made to give an authoritative interpretation of the Code. This is a voluntary association; it has representation on the Electrical Committee of the National Fire Protection Association, which prepares the Code, but it has no right, and claims no right, to give a final interpretation of anything in the Code. It is only intended to give the interpretation which seems correct to the members of the Executive Committee. No attempt is made to edit or correlate the answers from the different members of the Committee, as it is felt that the occasional difference of opinion is calculated to lead to a further study of the matter in question, further discussion and the final clearing up of obscure points.

The aim is to help toward a better understanding of the Code on the part of all; a more uniform conception of its meaning; increased precision in applying it; and harmonious action of those using it, for the common good.

Alternating-Current Bell-Transformer Wiring.

Question 261. In installing bell wiring where the bells are operated from an alternating-current 110 to 12-volt transformer, how does the secondary wiring have to be run, and what type of insulation should be used on the wire?

Answer 1 (U). When an approved transformer is used, ordinary bell construction may be employed.

Answer 2 (W). Rule 85*n* does not state.

Answer 3 (A). Wires should be damp proof and be run the same as in case of battery work.

Answer 4 (H). Rule 85 would seem to indicate that the secondary wiring must be run, must have the same insulation as fixture wires (1/64-rubber) and that it must be run with the same care as required for wires of higher potential.

Answer 5 (P). If an approved two-coil bell-ringing transformer is employed, I see no reason for requiring anything other than bell-wiring construction for the secondary. With an autotransformer the wiring should conform to the requirements of class *C*.

Answer 6 (O). If an approved bell-ringing transformer is used, the primary must be installed according to the rules for elctric-light wires. The secondary is an entirely separate and distinct circuit not connected with the primary and may be installed in any desirable manner.

Answer 7 (E). I do not understand that this point has been considered by the Code.

Answer 8 (Q). According to the 1913 edition of the Code, bell wiring connected to any transforming device, machine or combination of machines which develops a difference of potential between any two wires of over 12 volts, should be wired in accordance with the rules covering lighting circuits and the same class of insulation should be used.

Answer 9 (T). The Code has no restrictions, it relies on the efficiency of approved-type bell-ringing-transformer insulation.

Answer 10 (J). The manner of running and insulating secondary wires when supplied from an approved bell-ringing transformer is not specified by the Code except as indicated by sections 85*n* to *p*. The secondary wiring

need not be installed and insulated according to class *C* rules if the transformer is one approved for bell-ringing service. The specifications for construction of bell-ringing transformers are given in section 81*d* of the Code.

Answer 11 (D). No type of insulation and no requirements for installation of bell wires supplied from transformers are specified by the Code.

Answer 12 (S). If transformer is of an approved type, as called for in rule 81*d* any kind of wire or type of insulation may be used.

Answer 13 (F). Class *C* wiring.

Answer 14 (M). The requirements will be found under rule 85*n* to *p*.

Answer 15 (N). The wiring of the primary must be in accordance with class *C* rules, but the secondary is not specified as to cover of wire except where they are bunched together in a vertical run rule 85*o*. I have known one case where a well made autotransformer was planned for. Here I demanded straight class *C* wiring in consequence of which a two-coil transformer was substituted.

Answer 16 (L). If the transformer is constructed according to rule 81*d*, item 3, second paragraph, the only rule that may be construed as bearing on the matter is rule 85*n* and the fine-print note apparently permitting any type of insulation to be used.

Answer 17 (Y). The wiring on the primary side must be in accordance with the requirements of class *C*. On the secondary side ordinary bell wiring may be used.

Answer 18 (B). As may be seen by referring to rule 85, section *p*, provision is made that where transformers or other devices for supplying current for signalling systems from light, heat or power circuits are used, they must be of a design expressly approved for this purpose. The primary wiring must be installed in accordance with the rules for class *C* which relates to low-potential systems, light, heat or power, and secondary wiring in accordance with class *E* which relates specifically to signalling systems.

Direct-Current Bell-Transformer Wiring.

Question 262. In case of the so-called direct-current transformer, that is, a potentiometer wire where a high resistance of sufficient carrying capacity is extended across the mains and the reduction in voltage made by looping the bell circuit around a suitable fraction of the whole resistance, what insulation is required on the bell wiring?

Answer 1 (U). If the so-called direct-current transformer is approved, I know of no rule covering the wiring.

Answer 2 (W). Rule 85*n* does not state.

Answer 3 (A). Wiring should be the same as low-potential system, that is No. 14 rubber-covered throughout.

Answer 4 (H). The insulation required for fixture wire would seem to be sufficient.

Answer 5 (P). In this territory we are opposed to direct-current transformers employing the potentiometer principle, and would approve same only if the secondary were of class *C* construction throughout.

Answer 6 (O). No device as described is listed as approved, therefore its use would not be considered under

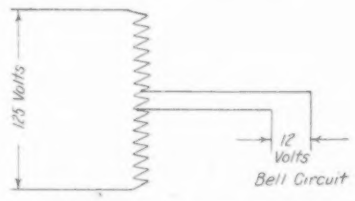


Diagram of Connections for Question 262.

any circumstances. The bell circuit, however, is the same as the 110-volt lighting circuit and should not be considered as a safe installation, unless wired in full accordance with rules of class *C*.

Answer 7 (E). I am unable to find that this subject has ever been determined by the Code.

Answer 8 (Q). My reply would be the same as to the previous question, adding that we do not encourage the use of this system.

Answer 9 (T). If this device is ever approved, the secondary wiring should be installed in accordance with class *C*.

Answer 10 (J). Bell wiring supplied in this manner or electrically connected in any way with the 110-volt circuit, must be constructed and installed in all respects according to the regular class *C* rules. The pressure between the bell wiring and ground is the same as between the electric-light wiring and ground, and danger arising from leakage to earth is as great in the one case as in the other. The reduced voltage would lessen the danger of short-circuits between the bell wires themselves but that is all.

Answer 11 (D). There are no provisions in the Code covering this class of construction.

Answer 12 (S). This direct-current transformer is not in the same class as the alternating-current transformer which is aproved under rule 81*d*. See rule 85*h* and *l*.

Answer 13 (F). Class *C*.

Answer 14 (M). This system would not be approved.

Answer 15 (N). This is not specifically referred to in the Code. I would approve it under the following conditions:

(1) One terminal of the bell circuit should co-incide with one terminal of the appliance for the 110-volt lines, and this terminal should be connected to the neutral of the direct-current circuit if there be one.

(2) If there be no neutral, the bell circuit taps should be equally distant from the two 110-volt terminals, and the device should be so fitted as to make this change possible.

(3) All bells and fittings should be made so as to withstand satisfactorily 110 volts in case of accidental contact.

(4) The bell circuit should be fitted with a positive-action current-limiting device which can not be overset.

(5) All wiring throughout and all fittings should be of type and construction in accordance with class *C* work.

(6) As there is no such device on the approved list, any such device it was desired to use would have to be submitted to this department for test and approval.

Answer 16 (L). If the potential-reducing device is not constructed with a positively acting, current-limiting device, the attached wiring should be subject to rule 85*h*.

Answer 17 (Y). The wiring must be in accordance with the requirements of class *C*.

Answer 18 (B). In this case, as there is always a possibility resulting from grounded condition of the so-called bell wiring to permit of an excessive voltage on the bell circuit, wiring should be installed under rules for class *C*, or so-called low-potential wiring.

It is reported that ground has been broken at Floodwood, O., in the heart of the Hocking Valley coal field, for the central power station of the Ohio Electric Power Company, and initial units will be in operation by fall.

Public Service Commissions

DECISION OF THE SUPREME COURT OF MICHIGAN CONCERNING THE VALIDITY OF THE "DAY TO DAY PERMIT" UNDER THE CONSTITUTIONAL LIMITATION TO THE TERM FRANCHISE.

The Michigan Supreme Court has rendered a decision sustaining the validity of the permit or franchise agreement between the City of Detroit and the Detroit United Railway Company in the case of Peck v. Detroit United Railway (146 N. W. 977). Certain property owners filed a bill of complaint to restrain the company from constructing a line in compliance with the terms of the franchise granted to it.

The permit granted the company by the City of Detroit did not fix a term limit for the expiration of the contract but provided that it be revocable at any time at the pleasure of the city. The complainants in this case contended that such a permit was invalid under Article 8, Section 29 of the Michigan Constitution adopted in 1908 which provides that no franchise or license shall be granted by any municipality "for a longer period than thirty years."

The indeterminate-permit provision adopted in the public-utilities law of Wisconsin and Indiana provides for the issuing of indeterminate permits which are exactly comparable with the franchise here involved in that the grant to the utility does not terminate at the expiration of a definite period but is revocable at any time at the will of the municipality upon proper compliance with the provisions of the law for the taking over of the property of the utility by the municipality.

In a number of states special laws or constitutional provisions limit the term of contract from 25 to 50 years and the question has been raised as to whether indeterminate permits can be used in such states without the revocation of the law or the passing of a constitutional amendment. A similar contention has been raised as a hindrance to the general adoption of the indeterminate-permit provision in public utility laws such as have been adopted in the laws of Wisconsin and Indiana. The decision of the Michigan Supreme Court, however, holds that, inasmuch as the franchise may be revoked at any time, it is not a term franchise and therefore is not in violation of such constitutional provisions. The decision of the Supreme Court reads, in part, as follows:

"It is the complainants' contention that under section 29, article 8, of the Constitution, the grant in question is invalid, because it contains no maximum term limit beyond which it cannot run, although the right of revocation is reserved to the grantor. What is the grant in question? The most that can be claimed for it is that it is a revocable right. It is immaterial whether it is termed a grant, license, franchise, or permit. Its important feature in this discussion is that whatever it is termed, it is revocable at the will of the city, whenever the public interest requires its termination. By its terms this is to be determined by the common council or the people of the city of Detroit, at their pleasure or caprice. The resolution clearly provides that no term right shall be acquired by the railway company because of the acceptance of the grant by it, and by virtue of the provisions of said section 29, article 8, of the Constitution, which is a clear limitation on the power to grant franchises or licenses, this grant of power could not extend beyond the period of 30 years fixed by the section, even if it should not be revoked by the granting power before the expiration of that time. In the absence of a time limitation in the grant, it must be assumed that it cannot extend beyond the term fixed by the Constitution. (Boise Water Co. v. Boise City, 230 U. S. 84, 33 Sup. Ct. 997, 57 L. Ed. 1400.) Not being a grant for a longer period than 30 years, which is prohibited by the Constitution, and, complying with section 25 of article 8 in that it is 'subject to revocation at the will of the city,' we are clearly of the opinion that the resolution making the grant was not in violation of any constitutional prohibition. * * *"

It is provided in the Indiana law (Section 254, of the Towns and Cities Act of 1905) that "No such contract shall be entered into by any city or town for furnishing such city or town, or its inhabitants, with water, motive power, heat or light, upon or along the streets of such city or town, for a term longer than twenty-five years." This provision of the law is quoted in the decision of the Indiana Public Service Commission, City of Gary v. Gary Interurban Railroad Company, and the Commission makes the following statement:

"In Hester et al. vs. Town of Greenwood et al., 172 Ind. 279, the Supreme Court of this State held that this section did not prohibit a town from granting a franchise for more than twenty-five years. When construed with other acts, the evident meaning of section 254, so far as the term of the franchise is concerned, is that twenty-five years is fixed as the limit concerning the terms and conditions upon which the franchise is granted, and not to the franchise itself."

CALIFORNIA.

Security Issues of Electric Companies. The San Joaquin Light & Power Corporation was authorized to issue $3,051,000 of five-per-cent bonds and the San Joaquin Light & Power Company was authorized to issue $129,000 of five-per-cent bonds. The proceeds are to be used for the purpose of retiring outstanding underlying bonds.

ILLINOIS.

Certificate of Public Convenience and Necessity. The Champaign County Electric Company was granted authority to construct and operate a plant and equipment for furnishing electricity for light, heat and power purposes in Thomasboro and adjacent territory.

MASSACHUSETTS.

Demonstration of Difficulties of Telephone Service. A switchboard with full equipment has been installed in the office of William H. O'Brien, chief of the telephone division of the Public Service Commission to enable the Commission to become acquainted with the operation of the telephone system by practical demonstration. This equipment is also to be used for demonstrations to the public. A subscriber having cause for complaint may ask for a demonstration in the office of the Commission so that he may understand the nature of the defect of which he is complaining, the reasonableness or unreasonableness of its continuance, and the prospects of a remedy. It is hoped that in this manner a better understanding between the telephone subscribers and the companies will be secured so that a company will not receive unde-

served blame when considerable time is required in correcting service conditions, and on the other hand, so that subscribers will know when a matter can be quickly corrected and hold the company properly responsible for satisfying the complaint without unnecessary delay.

Bond Issue to Supply Working Capital. The Public Service Commission approved an issue of $1,000,000 of Boston Elevated 30-year bonds, to bear interest at a rate not exceeding five per cent. The proceeds of the issue are to supply working capital. A law of 1909 provided for the issue of bonds for this purpose.

NEW JERSEY.

"Seven Sisters Law." The State Supreme Court handed down a decision upholding the Board of Public Utility Commissioners in refusing to permit the American Malt Corporation and the American Malting Company to merge under the "Seven Sisters" anti-trust law. As stated in the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN of May 23, the appeal to the Court contended that the Board did not have the right to exercise discretionary power in withholding approval of the proposed merger. The court finds that the merger would involve the issue of capital stock for less than its par value and that it would be unfair to the preferred stockholders of the malting company.

NEW YORK.

Extensions of Gas Mains. The Public Service Commission, Second District, issued an order, May 27, requiring the Buffalo Gas Company to make certain extensions of its gas mains. This matter has been before the Commission several times during the past year, and the order requiring extensions was withheld until the city of Buffalo had made settlement of its gas bill owing to the company. Now the settlement has been made, the extensions will be provided promptly.

PENNSYLVANIA.

Filing Rate Schedules. The time for filing rate schedules with the Commission has been extended to July 1. The schedules filed are to be those in effect January 1 and any changes since that date are to be filed as a separate supplement. The schedules may be submitted in typewritten form.

Uniform Accounts. Conferences are being held between those in charge of the divisions of accounting and of tariffs and rates for the Public Service Commission, and representatives of the electric, water and other public utility companies, with the exception of steam railroads and trolley lines, for the purpose of securing uniformity in the company reports required by the Commission.

WISCONSIN.

Security Issues of Telephone Companies. To the Watertown Telephone Company authority was granted to issue $150 of stock to replace a like amount of stock issued in ignorance of the stock and bond provisions of the Public Utilities Law. The Commission found that the proceeds of the sale of the void stock had been used in the manner prescribed by law.

The Oneida Farmers' Telephone Company was authorized to issue $4,000 of stock the proceeds to be used for the construction of a telephone line and system in the town of Cassian, Oneida County.

The application of the New Lisbon Mutual Telephone Company to issue $5,000 of notes was granted. The notes are to be of denomination of $500 and are to be sold at not less than 75 per cent of their par value. The proceeds are to be used in the purchase from the Juneau Electric Company of specified telephone properties. These properties had been valued by the Commission's engineers for the purpose of this proceeding.

The West Wisconsin Telephone Company was granted authority to issue $725 of capital stock the proceeds from the sale of which were to be used in paying indebtednesses incurred in the construction of lines and in extensions to existing lines.

Authority to issue $4,000 of stock was granted the Boyceville Telephone Company. The applicant is to use $2,500 of this issue in securing the properties of the Knapp Telephone Company in Boyceville. The Commission's engineers made an appraisal of this property. The additional $1,500 of stock is to be used in improving and extending the lines of the company.

Legal Notes

Occupational Disease Covered by Workmen's Compensation Act.

While few concerns in electrical lines are directly affected, a recent decision of one of the judges in Cincinnati on a phase of the workmen's compensation act is of interest to all manufacturers. It was held in this case that occupational diseases are within the meaning of the law providing compensation for personal injuries sustained in the course of employment, and that a workman employed by the Eagle White Lead Company, who had contracted lead poisoning was therefore entitled to compensation, which had been refused him by the Ohio Industrial Commission. This is the second decision on the point, but the first in which the Commission has been sued directly by an employee. The matter will undoubtedly be carried to the Supreme Court for a final review, in order that the point may be settled.

Utah Special-Lighting Law Declared Defective.

City Attorney Harper J. Dinniny has made a report to the City Commission of Salt Lake City, Utah, declaring that the special-lighting-improvement law passed by the Utah Legislature in 1913, permitting cities to create special lighting districts and assess the cost of installing and maintaining special street lighting against property owners is impractical, if not impossible in these provisions, and pointed out numerous defects therein.

He reports that it is not in line with other state laws referring to public improvements, and recommends that no action be taken to make the provisions of this law effective in Salt Lake City until it can be amended so as to harmonize it with the present statutes pertaining to special assessments.

The law was passed by the Legislature so as to give the property owners in the business and residential districts an opportunity to improve their districts by installing special ornamental lighting therein, and to divide the cost of these installations equitably between the various property owners benefited.

Several of the city's most progressive business men who were instrumental in having the 1913 law passed are arranging to have such amendments made as will be needed to make the law effective.

New Electrical and Mechanical Appliances

The Union Carboy Inclinator.

The increasing use of nitric, hydrochloric, sulphuric and other acids in industrial establishments has called for some means of safely and economically handling the carboys in which these acids are usually shipped. Since a carboy when full may weigh above 200 pounds, it is an unwieldy thing to handle, particularly when it is remembered that it is filled with corrosive acid or other chemical. To drain the acid from one of these carboys usually has required two men, and even then there has been much spilling of acid, burning of clothes and hands, and occasionally breaking of carboys.

These difficulties have been overcome by a device known as the Union carboy inclinator, which is illustrated herewith. The base and uprights, which are assembled together, and the hanger arms for the box are made of strong, clear maple. The box is made of clear spruce lumber and is suspended by three-quarter-inch hanger bolts. At the front of the box is a hinged drop gate, which in Fig. 1 can be seen resting firmly on the base. This serves to take the impact when the heavy carboy is placed in the box. A safety key, shown at the right, protects the box from swinging.

When the carboy has been placed in the box, the gate is swung upwards, as shown in Fig. 2, and clasped by slotted spring steel fasteners, which hold it securely in place. At the back of the box is an adjustable steel clamp rod with broadened head which is brought down above the upper rear edge of the carboy. This clamp rod is adjustable through a vertical range of eight inches and its curved head extends inward five inches so as to permit engaging the top of carboys of any size. The clamp arrangement for this rod is shown in Fig. 2. By means of a lever bar the rod can be instantly adjusted and when forced down the bar is retained by a spur which engages a saw-tooth plate secured to the rear wall. This firmly holds the clamp rod in position and, as shown in Fig. 3, the rod keeps the carboy in place when the outfit is tilted.

In order to incline the carboy the safety key at the right is withdrawn. The center of gravity is so adjusted that even then the carboy is well balanced. It requires little effort, however, to tilt the carboy and permit withdrawing any quantity of the liquid. One man can easily do this, even to draining out the very last of the acid. All metal parts of the outfit are heavily painted. The entire equipment is shipped in knock-down condition, so as to make a compact crate.

The Union carboy indicator is manufactured by Horace M. McCord & Company, Lumber Exchange Building, Minneapolis, Minn.

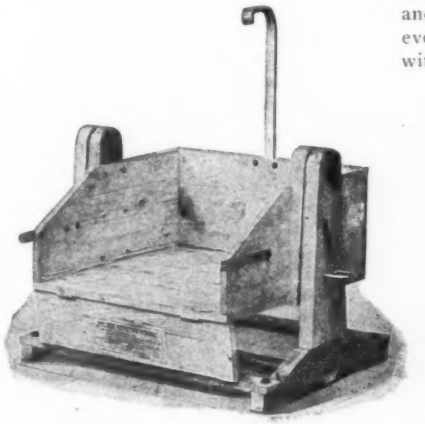


Fig. 1.—Union Carboy Inclinator.

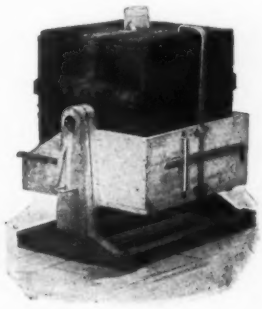


Fig. 2.—Rear View.

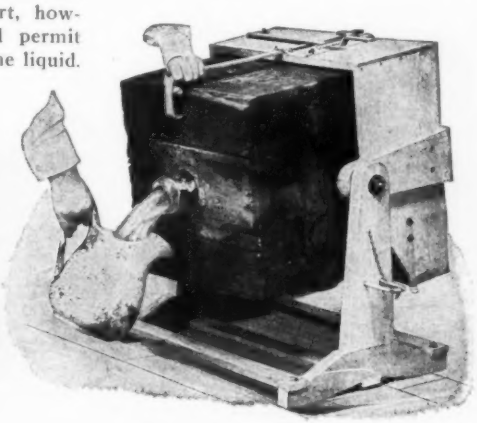


Fig. 3.—Tilting Carboy Easily.

Watt-Hour Demand Meters.

For many years electric energy was sold altogether at a rate of so many cents per kilowatt-hour used, the rate depending only on the quantity. Recent years have seen a very decided change in this method of selling and other factors are now given due consideration. The most important of these is the rate of consumption called for, or the demand. There has, therefore, arisen a need for a watt-hour meter to measure this value.

Such a demand meter, known as the type R0, has been recently placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. It meets the growing need on the part of central stations for a meter to determine by a simple reading the maximum demand of an installation. The new instrument is a single meter that records without the use of a clock mechanism both the kilowatt-hours consumed and the maximum kilowatt demand.

Because it fulfills both these purposes it is an ideal meter for determining maximum demand and load-factor as a basis for rates, as well as the diversity-factor of the station. It provides precisely the readings needed on systems that base their charges on maximum demand and power delivered; both readings can be taken monthly. The meter records the maximum demand of the connected load, but not the time at which the maximum occurs.

The watt-hour demand meter is installed in the same manner as an ordinary watt-hour meter and requires no additional apparatus or wiring. The maximum demand is indicated by a pointer sweeping over a four-inch dial, and the watt-hour load is recorded as usual on a four-dial counter.

The instrument has no clock, contacts, or other delicate parts that are likely to require attention, and the

mechanism is so simple that maintenance costs are but little more than those of watt-hour meters. In one form of the instrument the cover is entirely of glass; in another, a glass window is provided for the dial, as shown in the illustration.

The meter is a combination of an induction watt-hour meter, an induction wattmeter, and an escapement form of time element. The instrument has a standard Westinghouse electric type OA watt-hour meter movement, including electromagnet, permanent magnet and aluminum disk. In addition, it has an auxiliary disk sector supported on a jewel-and-ball bearing so that it can move in the air gap of the electromagnet, in such a way that it does not interfere with the accuracy of the main disk, which always rotates at a speed proportional to the load. The rotation of the auxiliary disk is restrained by a spiral spring, making its final deflection proportional to the watts load. The auxiliary disk and its spring and pointer constitute an indicating wattmeter.

Combined Watt-Hour and Demand Meter.

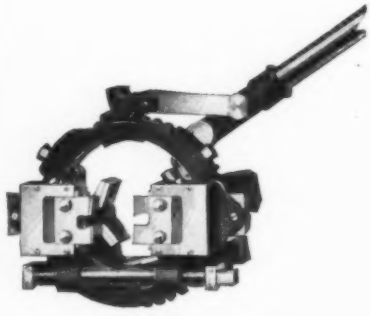
The shaft of the auxiliary disk is geared to an escapement wheel, and the claw restricting this wheel is oscillated by an eccentric on the main shaft. The auxiliary disk therefore advances step by step at a speed determined by the speed of the main watt-hour meter disk, that is, at a speed proportional to the load. It continues to advance until the spring tension balances the torque produced in the auxiliary disk. The demand mechanism is then in equilibrium and the pointer indicates the watts.

As the total deflection and the rate of deflection of the auxiliary disk vary in direct proportion, the time required to reach the maximum position when any constant load is passed through the instrument is a constant. For example, if a load of 500 watts is applied to a five-ampere, 100-volt meter with 15-minute time element, the demand mechanism will reach equilibrium at the 500-watt point in 15 minute. If, instead, a load of 1,000 watts is applied to the meter, the demand mechanism will have to move twice as far, to the 1,000-watt point, to reach equilibrium; but the double load will move the watt-hour disk twice as fast, causing the escapement to allow the demand disk to move twice as fast, and it will cover the double arc in the same time.

A mathematical analysis of the instrument shows that the deflection for any varying load that does not continue long enough for the instrument to reach equilibrium is equal to the average load during the interval.

The auxiliary disk drives the demand pointer through a dog, and a fine-toothed ratchet and pawl holds the demand pointer in the position of a maximum deflection, until released by hand. A second ratchet and pawl allows the auxiliary disk to fall back to equilibrium under its spring tension if the load falls below that corresponding to its position at any moment, but prevents it from advancing except as controlled by the escapement as before.

The maximum-demand pointer can be reset instantly by pressing a sealed button on top of the cover. This raises the pawl that holds the pointer in its maximum position and a light spring returns the pointer to zero, or to the position of the auxiliary disk.



Square-End Pipe Cutter.

New Beaver Square-End Pipe Cutter.

The Borden Company, Warren, O., has for some two years been making a number of square-end pipe cutters in the smaller sizes which have met with much success in service, about 20,000 of these tools being in use. The company has just placed on the market a new and larger size of this tool, known as the No. 10 size. This has a range for cutting pipe from two and one-half inches to four inches in diameter. Like the smaller sizes, the new tool has peculiarly shaped knives which are automatically fed, so that it is unnecessary to feed the knives separately, as is the ordinary practice.

The most distinctive feature of these knives, however, is that they cut out a very thin section of the pipe instead of depressing it. This makes a clean and square cut entirely free from burrs. It has been found that these cutters never split the pipe and that the pipe retains its full internal area. Thus it is unnecessary to ream out the pipe and if it is to be threaded the die can be started more easily than if the pipe has been cut by the ordinary type of cutter. This new four-inch cutter is practically like the smaller sizes, except that it is operated by a ratchet and therefore can be used in any position. It has been found in practice that a piece of heavy four-inch steel pipe can be cut off with this cutter in less than four minutes.

New Brass-Shell Sockets Operated by Push-Button.

The extensive and satisfactory use of Cutler-Hammer push-button pendent switches and porcelain sockets has been the means of creating a demand for a brass-shell socket having indicating push-buttons instead of the rotary key and employing the high-capacity switch mechanism as used in the above-mentioned switches and porcelain sockets. The rotary-key flush switch has given way to the push-button type and the push-button socket is therefore likely to come into favor also.

Push-Button Brass-Shell Socket.

The new sockets shown in the accompanying illustrations have a number of important features: indicating push-button operation; quick make-and-break switch mechanism rated at 660 watts, 250 volts; automatic locking nozzle which eliminates the weak set-screw; cord-strain relief in all pendent sockets; and the strong simple snap lock for securing the cap to the shell. The mechanism used in these sockets is exactly the same as that used on other C-H devices rated at 750 watts and is only limited to 660 watts be-

cause there is no higher rating allowed on screw-shell sockets by the Underwriters. Because of the extensive use of electrical devices operated from lamp sockets, this high-capacity socket is particularly advantageous.

In spite of the many improvements in electrical devices, during the past 30 years the sockets have always been secured to the fixture by means of an

Exploded View of Push-Button Socket, Showing Main Parts.

iron set-screw and operated by a rotary key, the key being similar to that used on the gas fixture. The new C-H line of sockets has an automatic locking ring to replace the set-screw and has indicating push-buttons instead of the rotary key.

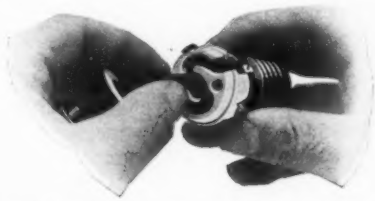
In the new C-H sockets the use of the common electrical phrase, "Push the button," has been extended to one of the oldest electrical devices. The

Locking Ring is Placed Over Fixture Nozzle and Cap Then Screwed in Place.

operation is very easy and natural. With pendent sockets this is especially desirable as only one hand need be used and the lamp is not twisted or jarred. In grasping the socket the thumb and finger are placed in the proper position to operate the socket. Where a husk is provided on the fixture extension buttons can be placed on the socket, which extend through small holes in the husk and allow operation.

The new locking ring of the C-H sockets makes it possible to attach the sockets securely on varying sizes of fixture nozzles even when a socket cover or husk is used. This is impossible where the set-screw is employed, as a screw-driver cannot be operated inside of the husk to tighten the screw.

In a recent test a C-H socket was secured to one end of a pipe and an-



Cord After Being Secured to Terminals is Placed in Groove and Socket Bushing and Cap Then Put in Place.

other socket with the ordinary set-screw secured to the other end. Grasping one in each hand and turning counter clock-wise the latter socket slipped, damaging the thread, then the joint where the threaded ferrule is fastened to the cap gave way and allowed the socket to slip around. The C-H socket did not loosen in this test.

Another difficulty overcome by this locking feature is the positioning of the buttons. All work during the past few years has been along the lines of providing a multiplicity of catches for snapping the cap on the shell so that the key might be located where desired. This, however, may have a tendency to weaken the locking. The locking ring of C-H sockets allows the cap to be turned after it is secured so that the location of the buttons can be taken care of, while a strong and

Keyless Brass-Shell Electrolier Socket Similar to Push-Button Type.

simple snap can be used which locks the cap and shell securely together. The shell is not weakened by many slots or perforations.

A cord grip in the pendent type of sockets makes unnecessary the usual knots and removes all strain from the terminals. This cord grip does not require any threading through or twisting of the conductors. It is simply necessary to secure the conductor terminals to the binding-screws which are placed far down on the socket and are upset. The strength of this cord grip was indicated by a test which resulted in the breaking of a No. 18 two-conductor flexible cord without any appreciable strain being transmitted to the socket terminals.

This new socket line put on the market by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., consists of push-button and keyless types for fixtures and pendent installations, besides a short keyless socket especially suitable for small fixtures. The approval of the Underwriters' Laboratories has been secured for the entire line.

A Play to Boost Electric Breakfasts.

A little one-act play entitled "Cooking Breakfast at the Table" has just been brought out by the Westinghouse Electric & Manufacturing Company, the personnel of which is as follows:

Toasty, a Westinghouse electric toaster stove.

Perky, the Westinghouse electric percolator.

Time O'Day, the grandfather's clock.

Mr. and Mrs. Thrifty, the exponents of Westinghouse electric ware, who have become well known to the public through the Westinghouse motion pictures.

The play describes the preparation of breakfast by Mr. and Mrs. Thrifty with the Westinghouse devices, which themselves take part in the discussion as to their relative merits.

German Wireless Combination.

According to cable dispatches from Berlin, Germany, the Goldschmidt High Frequency Wireless Telegraph Company has given to the German Telefunken Wireless Telegraph Company an option on its plants in Germany and the United States. It announces that a message of 3,000 words of consecutive text was transmitted within a few hours on May 26 from its American station at Tuckerton, N. J., and received perfectly at Eilvese, near Hanover, a distance of about 4,060 miles.

The High Frequency Company says it may now be expected that regular commercial traffic between Germany and the United States will soon be a practicable possibility. The Telefunken Company states that, if it eventually decides to take advantage of the option, it will then be decided which system will be used in a transatlantic service, its own or that of the High Frequency concern.

Large Testing Transformers Shipped to Japan.

The accompanying illustration shows two testing transformers, having a normal rating of 360,000 volts continuously, and 500,000 volts for short periods. These transformers were recently furnished the Inawashiro Hydro-Electric Power Company of Japan, one to be installed in the generating station on the Nippashi River at the outlet of Lake Inawashiro, about 145 miles from Tokio, the other in the receiving substation at Tokio, where they will be used for testing transmission lines and apparatus in the stations.

The design features of interest in these transformers are: the arrangement of the windings to give distributed static fields, the use of condenser terminals to give distributed stresses from terminals to ground, and the terminal "hat" to distribute stresses from terminal tip to ground. The transformers are 19 feet high from base to top of terminal, and the tanks are 9 feet high and 9 feet in diameter. One high-tension terminal of each transformer is grounded to the core and case, the other being brought out as shown in the illustration. By connecting the cases of the two transformers as shown one million volts can be developed between the two high-tension terminals.

Two Westinghouse Testing Transformers Connected in Series for 1,000,000 Volts.

These transformers were built by the Westinghouse Electric & Manufacturing Company, and are similar in construction to the 500,000-volt testing transformer built by the company and previously described in the technical press.

The Thompson Single-Cord Cutout Hanger.

For some time tungsten lamps in the larger sizes have been used in railroad depots, steel plants and other industrial establishments, but the development of the new gas-filled lamps is expected to increase the use of incandescents for such interior and yard lighting very materially. In many plants of this type the lamps must be hung very high. In the case of gas-filled tungsten lamps this is particularly necessary because of their intense intrinsic brilliancy. In order to get the best results out of an incandescent lamp installation of this type it is imperative to use a reflector to throw into useful downward directions light that otherwise would be lost on the ceiling or trusses of the building. All of these requirements, together with the necessity for frequent cleaning in order to maintain the efficiency of the lighting units approximately at the highest point, require that the lamps and reflectors should be made readily accessible, and for this purpose the Thompson Electric Company, 102 St. Clair Avenue, N. W., Cleveland, O., has placed on the market a new form of its cutout hangers.

This hanger is a development, with certain improvements, of the Thompson double-cord hanger which has been extensively used for arc lamps in industrial establishments. The new hanger, however, is operated by a single cord or wire rope. A general view of one of these hangers with lamp attached is shown in Fig. 1. These hangers are intended for automatically cutting out any lamp in a multiple circuit and to permit lowering to the floor for cleaning, trimming or lamp renewal. While designed particularly for use with the former standard or new gas-filled tungsten lamps, they also are serviceable for any type of arc lamp. They make the lamp readily accessible without the need of ladders or cranes. The lamp trimmer or cleaner is therefore at all times safe, both because he works on the ground and because the lamp is disconnected from the circuit while he is working on it. The wiring for the lamp circuit can be carried in straight lines directly to the hanger without the need of dangling loops of live wire. The wiring may be open or in conduit as desired. Since the hanger permits caring for the lamps without using a traveling crane, the time of the latter and more expensive equipment is not taken up with lamp trimming or maintenance, and it can be used entirely for the purpose for which it was installed.

Fig. 1.—Single-Cord Medium-Canopy Cutout Hanger with Reflector and Lamp.

In Fig. 2 is shown a slightly different form of the new hanger, known as the skeleton type. This illustration also makes clear the arrangement of the cutout mechanism. Electrical connection is obtained by two simple knife contacts which are forced together by a powerful spring *B*. When in operating position, as shown in Fig. 2, the pawl *A* holds the lamp, and this together with the spring *B* prevents loosening of the electrical or mechanical connection through jarring or vibration.

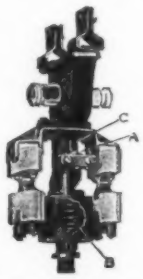


Fig. 2.—Hanger in Operating Position.

Fig. 3.—Lamp Being Lowered.

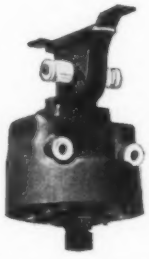


Fig. 4.—Deep-Canopy Hanger.

An ingenious feature of the lowering

mechanism is that it works somewhat on the principle of a spring window-shade roller, that is, in order to release and lower the lamp the cord is first pulled as far as it will go and then by giving a quick release the pawl *A* is thrown out of the catch *C* and the latter passes out before the pawl can drop back into place. When raising the lamp again to the operating position, the cord is pulled up as far as it will go and then released slowly; this allows the pawl to fall into place and secure the lamp in operating position. In Fig. 3 is shown another ingenious feature which insures that when the lamp is again pulled up its contacts will be brought perfectly in line with the stationary contacts on the hanger. Thus, no matter how much the rope twists the lamp is always brought up in perfect alinement and the polarity of the lamp cannot be reversed, nor will any reflectors of the angle type be turned in the wrong direction.

These hangers are made for two kinds of suspension. For most purposes it has been found that the span wire has important advantages, especially in the installation of large lamps in mills, since it enables the lamps to be located where their light will be most useful; the span wire aso acts as a natural shock absorber and is therefore useful in the protection of lamps in forge shops and similar plants where violent vibration is liable to occur. For this type of mounting cable clamps are secured to the top of the hanger as shown in Figs. 1 and 2. Another method of suspension is to a girder or bracket arm for which the hanger is provided with a small cleat bail as shown at the top of Fig. 4; this permits the hanger to be substantially bolted or clamped either to a flat surface or to a pipe, as in Fig. 3.

Where lamps are to be used indoors or in places where there is no exposure to the weather the skeleton type of hanger shown in Figs. 2 and 5 is employed. A hanger known as the medium canopy type is shown in Fig. 1. This permits mounting either indoors or outdoors and protects the hanger mechanism against ordinary weather conditions, except sleet. Where the hanger is to be used in very exposed situations the deep-canopy type shown in Fig. 4 has been found to give protection against rain, snow and sleet. Two types of shade-holder for tungsten lamps are made to suit these hangers. One is threaded on the outside to screw into the reflector and the other is threaded on the inside to be secured by a nipple or tubing in case the lamp is to hang some distance below the hanger itself. If arc lamps are to be used, a U-shaped bail is used in place of the shade-holder. This type of hanger has been installed by some of the largest steel mills and railroads, and has been found to give excellent service. All parts of the hanger that are subjected to strain are made of malleable iron or phosphor bronze.

Wakefield Reversible Direct and Indirect Fixtures.

The increasing popularity of indirect lighting has created a demand for a fixture of this type, which, while of neat design, good construction and efficiency, shall also be made of durable material aud moderate cost, so as to adapt it for many commercial and industrial establishments where artistic embellishment is unnecessary but good lighting is required.

To meet such needs the F. W. Wakefield Brass Company, Vermilion, O., has placed on the market a line of fixtures called "Mellowlites." Fig. 1 shows one of these fixtures and gives a good idea of its simple but pleasing design. The reflector bowl is made of enameled steel to give good efficiency combined with indestructibility. By fastening the bowl by light rods with hooked ends, the bowl can be readily swung down or entirely removed for cleaning.

Fig. 1.—Wakefield Mellowlite Indirect Fixture.

Fig. 2.—Fixture Adapted for Direct Lighting.

A unique feature of this outfit is its reversibility. The ring on the stem to which the upper ends of the three bowl-supporting rods are fastened can be adjusted along the stem. By making this adjustment, removing the knob shown at the bottom of the bowl in Fig. 1, and then reversing the bowl the fixture can be readily converted into a direct fixture, as shown in Fig. 2. Thus the same unit can be used to provide direct or indirect lighting, as the tenants or occupants of particular rooms prefer.

These fixtures are made with three diameters of bowls, 14 inches, 18 inches and 24 inches. The lengths run from 30 to 42 inches. These fixtures are particularly suitable for the larger sizes of tungsten lamps, say, 150 to 1,000 watts. The new 750 and 1,000-watt gas-filled lamps with the larger fixtures make an excellent combination.

Two sizes of semi-indirect Mellowlite fixtures, 14 and 18 inches, are also made by the Wakefield Company. These are very similar to Fig. 1, except that the bowl is made of an excellent opaline glass rectifier. Pleasing appearance, ease of cleaning and moderate cost also characterize the semi-indirect units.

Extensive Traction Improvements for Philadelphia.

The Philadelphia Rapid Transit Company has entered into a tentative agreement with the city for the construction of a system of subways and elevated lines, involving an expenditure of about $63,000,000. The agreement provides for the city to build the necessary lines at an estimated cost of $45,600,000, the company to defray the cost of equipment to the extent of approximately $12,000,000, and operate the lines for a period of fifty years. At the end of such time the city is to receive all surplus earnings of the company in excess of six per cent on the par value of its stock. The proposed improvements include a subway under Broad Street, and elevated lines to Frankford and Darby, these to connect with the present Market Street subway and elevated lines. Provision has also been made in the agreement for the elimination of exchange tickets in 1920, and the substitution of universal transfers.

Current Electrical News

NORTH ATLANTIC STATES.

MANCHESTER, N. H.—The Manchester Light & Power Company will spend $25,000 a year for five years in putting its wires underground.

ATLANTIC CITY, N. J.—The Board of Public Utility Commissioners has approved the application of the Atlantic City Electric Company for the issuance of bonds for $103,000. The proceeds are to be used for fixed capital expenditures to plant and equipment. A.

MORRISTOWN, N. J.—The Morris & Somerset Electric Company will increase the capacity of its local power plant. Arrangements are being made for the installation of a new 1,500-kilowatt turbogenerator, and boiler equipment. A.

TRENTON, N. J.—The Public Service Electric Company will build a new substation in the Chambersburg section; the plant will be used for local distribution in this district. A.

EMPORIUM, PA.—This town has decided to purchase a 150-horsepower gas engine to operate with natural gas, direct connected to 2,200-volt generator, two-phase. Will also purchase switchboard and all necessary station equipment and will also be in the market for line equipment, including transformers, meters, etc. Address Charles Crandall, secretary, Borough Council, for further information.

SOUTH ATLANTIC STATES.

MILFORD, DEL.—Plans are being prepared for the power house of the L. D. Caulk Company, manufacturer of dental supplies. It is to be of brick and one story high. N.

CUMBERLAND, MD.—The Hagerstown & Frederick Railway Company is considering the erection of a power plant here.

PROSPERITY, S. C.—The city will install a $10,000 lighting system. Address the city clerk for particulars.

BALL GROUND, GA.—The town will obtain electric current from Amicacola Marble Company, Ball Ground, for a lighting system. Address the mayor for further information.

CHATSWORTH, GA.—The J. B. McCrary Company, Atlanta, Ga., is preparing plans for water works and lighting systems, to cost $25,000.

WINTER HAVEN, FLA.—Winter Haven Water, Ice & Light Company is contemplating additions to electric lines. W. F. Boyd is manager.

NORTH CENTRAL STATES.

CAMBRIDGE, O.—The new Midland Power & Traction Company will erect a substation here to handle the high-tension power lines from Coshocton. The lines will be completed in about 60 days. J.

CINCINNATI, O.—George Balch is preparing to erect a large garage for the Fischer Auto & Service Company, at a cost of about $50,000. Modern electrical equipment will be installed. L.

NEW CONCORD, O.—The town has sold a $2,500 issue of light bonds running for ten years, with five per cent interest, at a slight premium, and the proceeds will be devoted to the construction of a small lighting plant. Contracts will be let and material purchased shortly. L.

NORWOOD, O.—The City Hall Commissioners will re-advertise shortly for bids on the electric work involved in the new city hall, those first submitted having been rejected. L.

URBANA, O.—Two outside propositions have been received to install and maintain new arc lights here, one by a Boston syndicate, represented by E. W. Lothrop, at $62.50 per lamp per month, and one by the Ohio Electric Company at $55 per lamp per month. The local company's figure is $60 per lamp per month. J.

CHAMPAIN, ILL.—Eighteen thermostatic motors will be used in the heating apparatus for the new armory at the University of Illinois at Champaign. The heating system, which is to cost $18,000, will be installed in June. J. M. White is the supervising architect. Z.

EVANSTON, ILL.—It is stated that Northwestern University will install a private electric light plant.

BELDENVILLE, WIS.—H. O. Junkman is agitating the question of electric lights for this place. C.

FREDONIA, WIS.—L. H. Schmitz contemplates erecting an electric lighting plant in this village.

AURORA, MINN.—$20,000 will be expended for water and light improvements. Address the village recorder.

VILLARD, MINN.—Villard has voted in favor of building a $5,000 electric light plant.

ALBIA SPRINGS, IOWA.—The City Council is considering the proposition to furnish electric lights. Address the mayor for general information.

LINN GROVE, IOWA.—At a special election the Peterson Power & Light Company was granted a franchise for lighting the town.

BLUE SPRINGS, MO.—Nickols & Cannon have received a 20-year franchise for an electric-light plant and will begin work within the next 90 days. An ice-manufacturing plant also is to be established. M.

OAK GROVE, MO.—W. H. George has asked for a franchise for a light plant and the Council will vote on the requests at its June meeting. M.

TOWER CITY, N. D.—Aiken & Bartlett, of Fargo, are preparing plans for an electric light plant for this city. C.

DELL RAPIDS, S. D.—The Dell Rapids Light & Power Company has been incorporated with a capital of $20,000 by N. C. Draper, A. Powers, of Dell Rapids; and A. Powers, of Sioux Falls.

BARNES, KANS.—A $5,000 electric light plant is to be established at Barnes in the near future. M.

JETMORE, KANS.—$12,000 is to be spent for a municipal electric light plant. M.

KIRWIN, KANS.—$12,000 is to be spent for a municipal light plant.

VERMILLION, KANS.—The municipal authorities will spend $10,000 for an electric light plant shortly, a bond issue of that amount having carried at the election on May 26. M.

SOUTH CENTRAL STATES.

ASHLAND, KY.—Rufus Vinsant, of this city, and others, are reported to be interested in installing a waterworks and electric light plant.

LEITCHFIELD, KY.—Work is under way for the erection of buildings and the installation of machinery for an electric light plant here. The W. T. McCaskey Company, of Lansing, Mich., is doing the work, which will involve an expenditure of $10,000. W. N. Moss is the engineer. G.

LIVINGSTON, TENN.—The city is prepared to sell a franchise for the construction of an electric light and power plant. The Chamber of Commerce, E. C. Kight, secretary, has the project in hand. G.

HOT SPRINGS, ARK.—The Railroad Commission of Arkansas has granted a permit to the Ouachita Power Company of Arkansas to construct a hydroelectric power plant on the Ouachita River, about six miles southeast of this city. The company plans to develop 6,000 or 7,000 horsepower at its principal power dam. Power will be transmitted to Hot Springs, Benton, Malvern, Little Rock, and other points within 150 miles radius. They have also a permit to construct auxiliary and storage dams on the Ouachita River and its tributaries above their principal power dam.

HASKELL, OKLA.—Haskell Light & Power Company, has been incorporated with a capital of $10,000 by C. W. Marston, J. O. Dowdy, and E. B. Harris.

EL PASO, TEX.—A movement is on foot here for better street lighting, and to this end efforts are being made to secure contracts from property owners on San Francisco Street for the installation of a new system of lights on that street.

MEXIA, TEX.—W. W. Cook, Joseph Nussbaum and others have organized the Mexia Water, Light & Power Company, having a capital stock of $145,000. Waterworks, light and power plants will be built. D.

WESTERN STATES.

CARRIZOZO, N. M.—It is stated that J. H. Fulmen, of the Eagle Mining Company of Parsons, N. M., is planning to erect an electric power plant here to operate the mining property recently acquired by his company and to furnish current for a crushing and concentrating plant. D.

CLEARLAKE, IDAHO. — William C. Hazard, of Milwaukee, Wis., president of the Clearlake Power & Improvement Company, recently petitioned the Public Utilities Commission at Boise for a certificate of convenience and necessity for his company to construct and maintain an electric transmission and distribution lines in Twin Falls County, for the benefit of the cities and towns of that section. Clearlake is given as the principal place of business, and the company is capitalized at $750,000. O.

ELKS CITY, IDAHO. — Alfred Adams, of Atlantic City, N. J., and Hunter B. Supplee, here, well-known mining men of this section, have decided to install a commercial power plant, at this place, which will develop from 700 to 1,000 horsepower at the beginning. Water rights have been acquired on the Red River, and plans are being perfected for immediate construction of the plant that will serve the whole district with cheap power.

TUCSON, ARIZ.—The transmission line of the Tucson Gas, Electric Light & Power Company, which has just been extended to Sauharita Ranch, a distance of 10 miles, is to be further extended to Rillito Valley. Estimates for work on power plant and power plant machinery to be installed call for an expenditure of $90,000.

POMEROY, WASH.—William H. Galvani, engineer for the Pacific Power & Light Company, with headquarters in Portland, recently announced that improvements will be made to the local plant as soon as possible, including the connecting up of the plant with the Company's high-power line serving other towns in this region, and some needed extensions and improvements in the local territory. O.

SPOKANE, WASH.—Engineer J. C. Ralston has submitted estimates of the cost of a municipal light and power plant at $2,500,000.

BURNS, ORE.—The Harney Electric Company, was recently organized and incorporated with a capital stock of $250,000, by Harney County capitalists. The Company has named this city as principal place of business, and was organized for the purpose of taking over the J. Edwin Johnson holdings filed on the North Fork of the Malheur River, some 20 miles north of Drewsey. The power developed will be used for irrigation purposes, and furnishing heat, light and power for the Burns and Drewsey country.

GLENDALE, CAL.—A bond issue of $4,000 has been authorized to provide funds for the improvement of the municipal light and power plant.

NAPA, CAL.—The Calistoga Electric Company has been granted a franchise along certain streets in Napa County for the transmission of electricity for light, power and other purposes.

RIVERSIDE, CAL. — The City Council has started proceedings for the installation of an ornamental lighting system on Lime Street.

PROPOSALS.

MOTOR-DRIVEN MILLING MACHINE.—Sealed proposals will be received on June 10 by Chester Harding, commissioner, Washington, D. C., for furnishing and delivering one universal high-power milling machine, motor-driven, for use in the Fire Department.

ELECTRIC WIRING, ETC.—The members of the Board of Education of Macomb, Ill., are advertising for bids for the electric wiring in the new High School building. Bids will be opened on June 10. J. Ross Micket is president of the Board and J. H. Millsom is secretary. Z.

ELECTRIC PLANT.—Sealed proposals will be received at the office of the Lighthouse Inspector, New Orleans, La., until June 18 for furnishing and installing an electric plant for the completion of the tender Camellia. Blank proposals and particulars may be obtained by addressing the above.

CANAL CABLE.—Sealed proposals will be received at the office of the General Purchasing Officer, Isthmian Canal Commission, Washington, D. C., until June 8 for furnishing 185 snubbing posts, complete, with anchor bolts and washers. For further information address F. C. Boggs, major, corps of engineers, U. S. Army, general purchasing officer, and refer to Cable 5-25.

ELECTRIC ELEVATOR. — Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until June 15 for the removal of the present elevator and the installation complete of an electric passenger elevator in the post office at Wichita, Kans., in accordance with drawings and specifications, copies of which may be obtained from the Supervising Architect.

INTERIOR LIGHTING FIXTURES. —Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until July 20 for furnishing the interior lighting fixtures of a two-story building for the post office at Bozeman, Mont., and until July 30 of a one-story building for the post office at Greeley, Col., in accordance with drawings and specifications, copies of which may be obtained from the custodians of the sites or the Supervising Architect.

ELECTRICAL EQUIPMENT — Sealed proposals will be received by the Navy Department, Bureau of Supplies and Accounts, Washington, D. C., until June 16 for furnishing three electric furnaces, as per Schedule 6832, for delivery at the Navy Yard, Newport, R. I.; installing an underground telephone system at Narragansett Bay, as per Schedule 6835; on Type A induction motor, Class 1, 110 horsepower, 2,200-volt, three-phase, 60 cycles, as per Schedule 6839 for delivery at Navy Yard, Brooklyn, N. Y.; 30,000 feet lighting and power wire, rubber-insulated, single, solid, as per Schedule 6829, for delivery at the Navy Yard, Brooklyn, N. Y.; for 6,000 feet intercommunication cable, plain four and ten conductor; 148,000 feet plain, double flexible conductor for portables, insulated; 2,000 feet rubber-insulated cotton-covered wire for ignition circuits for combustion engines; 54,700 feet galvanized, soft-steel, leaded and armored, twin-conductor wire, all as per Schedule 6830, for delivery at the Navy Yard, Brooklyn, N. Y., and until June 30 for 10 two and five kilowatt radio sets for ship installation, as per Schedule 6811, for delivery at the Navy Yard, Brooklyn, N. Y.

NEW INCORPORATIONS.

ASHEVILLE, N. C.—The Ward Electric Company has been incorporated with a capital stock of $10,000 by M. C. Ward, C. W. Purefoy and others.

WAUSAU, WIS.—Marathon Electric Manufacturing Company has been incorporated with a capital stock of $25,000 by Neal Brown, D. E. Everest and E. M. Bischoff.

PERU, IND.—Miami Electrical Supply Company has been granted articles of incorporation, capitalized at $10,000. The directors are Ed. Trautmann, John Bethell and Samuel Fowden.

KINGSTON, WIS.—The Kingston Electric Company has been incorporated with a capital of $2,000 by L. A. Very, O. A. Oestreich, and Leora Westlake.

KANSAS CITY, MO.—The Kansas City Gas & Electric Fixture Company has been incorporated, the capitalization being placed at $15,000. James Butler, Henry W. Melenbacker and E. G. Breg are the incorporators. N.

KANSAS CITY, MO.—The Automatic Electric Light Company has been granted articles of incorporation, capitalized at $100,000. The incorporators are F. B. Willmont, W. H. Maloney and William F. Warner.

BUFFALO, N. Y.—Niagara Battery Corporation has been incorporated with a capital stock of $5,000 to manufacture electric batteries. The incorporators are George H. Woodward, H. B. Parry and E. C. Schlenker, all of this city.

BRONX, N. Y.—American Electric Sign Company, Incorporated, has been granted articles of incorporation, capitalized at $5,000. The incorporators are Philip Adelstein, Jacob Lieberman and Hattie Goldschmidt, New York.

CHICAGO, ILL.—Continental American Specialty Company has been incorporated with a capital stock of $100,000 to manufacture electrical supplies and novelties. The incorporators are K. W. Kemper, G. Cohn, A. J. Alsdorf, of this city.

NEW YORK, N. Y.—Majestic Electrical Appliance Company, Incorporated, has been granted articles of incorporation, capitalized at $10,000. The incorporators are Joseph P. Ryan and William Burrows, of New York City, and Arthur Rosenberg, of Jamaica.

NEW YORK, N. Y.—Reliable Gas Lamp Company, Inc., has been granted articles of incorporation to manufacture all kinds of gas and electric lamps, fixtures, etc. The capital stock is $6,000 and the incorporators are Sam Dubin, Louis Greenberg, of New York City, and David Guttenson, of Brooklyn.

JAMESVILLE, N. Y.—Zenith Wire Company, Incorporated, has been incorporated to manufacture and deal in electric coils and accessories used on automobiles, general plating, wooden novelties, copper wire, machinery and textiles. The capital stock is $100,000 and the incorporators are W. A. Beattie, H. V. Hulison, Syracuse; H. Hotaling, Jamesville.

ST. JOHNSBURY, VT.—The St. Johnsbury Wiring Company has filed articles of association, having a capital stock of $10,000. The incorporators are Elbert E. Gage, Robert W. McGillivray and Clarence A. Forrest, all of St. Johnsbury. The purpose of the company is to own and operate electric plants and deal at wholesale and retail in electrical appliances.

FINANCIAL NOTES.

The entire issue of $3,500,000 Northern Electric Company, Limited, first-mortgage sinking-fund five-per-cent bonds offered by Lee, Higginson & Company, at 95 and interest has been sold.

The Massachusetts Public Service Commission has approved the issue of $1,000,000 Boston Elevated 30-year bonds, to bear interest at a rate not exceeding five per cent per annum.

Holders of Cuyahoga Telephone Company stock have received notice that in exchange for their common and six-per-cent cumulative preferred shares they will receive common and seven-per-cent cumulative preferred of the Ohio State Telephone Company, par for par. Adjustment of fractions will be on the basis of $100 a share for Ohio State preferred, and $30 a share for Ohio State common. It is expected that holders of United States Telephone stock will receive par for par in the new company, plus fractional bonds of the Ohio State company.

Public announcement has been made of the new plan for Philadelphia transit development that is proposed following the recent conferences. The plan proposed provides for a total investment of approximately $63,000,000, of which, about $45,500,000 will be invested by the city in building the subway to elevated lines; about $12,000,000 will be provided by the Philadelphia Rapid Transit Company for equipment of city owned lines and about $6,000,000 will be provided for the Philadelphia Rapid Transit Company by outside interests in constructing a tube to Camden.

At a meeting of the board of directors of the Birmingham Railway, Light & Power Company, an operating subsidiary of the American Cities Company, J. S. Pevear, vice-president of the New Orleans Railway & Light Company, was elected president to succeed H. S. Ford, who resigned to become vice-president and general manager of the Cumberland County Power & Light Company. Mr. Pevear will continue in executive charge of the New Orleans company and J. H. DeWindt will be in charge of operations at Birmingham as general manager. The final contracts by which the Alabama Power Company, the operating subsidiary of the Alabama Traction, Light & Power Company, which will furnish current for operation of the Birmingham street railways and also for lighting and power from its hydroelectric development at lock 12 on the Coosa river, were signed. The Alabama Power Company will derive a gross revenue of about $350,000 from this contract and the Birmingham company will hold its steam stations in reserve.

Directors of the San Joaquin Light & Power Corporation have called a special meeting of stockholders for June 11 to authorize the issue of $3,500,000 cumulative prior-preference six-per-cent stock, changing the unissued $3,500,000 of present preferred stock into the new form. The prior-preference stock, if disposed of, will not only provide for the floating debt but will also provide a means by which the corporation will be able in the future to supplement the financing to be done through its first and refunding bonds. The Board also has called a special meeting of the stockholders for June 29 to vote upon the authorization of the issue of $2,000,000 bonds or debentures. In case the prior-preference stock is disposed of at a satisfactory price there will be no necessity for either authorizing or selling the bonds or debentures, the meeting for June 29 being called in order to save time in case the prior-preference stock is not authorized or cannot be disposed of at a fair price.

Interstate Electric Coropration has contracted for the purchase of the Great Bend Water & Electric Company, Great Bend, Kans., and the Hoisington Electric & Ice Company, Hoisington, Kans., and will add these properties to the plants at San Angelo, Trenton, Corry and Laredo already controlled. An audit of earnings of the two new properties for the year ended December 31, 1913, shows a balance, after payment of all fixed charges, of $28,953.

A stockholders meeting for readjustment of the finances of the Columbus Railway, Power & Light Company has been called for June 29. Approval will be asked of a plan that has been formulated by the officers, one feature of which is an amendment to the charter providing for the issue of $3,145,000 of four-per-cent prior-preference stock, for the purpose of taking up and retiring the $3,145,000 present outstanding bonds of the Columbus Railway Company, known as the first-consolidated-mortgage 40-year four-per-cent gold bonds, dated October 2, 1899, and maturing October 1, 1939. It is also proposed to issue $450,000 six-per-cent series-A preferred stock for the purpose of retiring the $450,000 outstanding bonds of the Columbus Electric Company, known as first-mortgage six-per-cent 25-year gold bonds. In order to make possible the issue of these bonds the stockholders will be asked to authorize an increase in the capital stock of the company from $11,550,000 to $15,145,000. The contemplated blanket mortgage requires the authorization of $25,000,000 first and refunding sinking-fund-mortgage six-per-cent bonds, to be secured by a mortgage or deed of trust on the property of the company. These bonds are to be issued from time to time upon consent of the Public Utilities Commission when necessary for the acquisition of property, the construction, completion, extension or improvement of facilities, or for the discharge or refunding of the company's obligations. The conditions of the mortgage will impose suitable restrictions upon the issue of additional bonds. This plan is designed to fully provide the basis for the present and future financing of the Columbus Railway, Power & Light Company. Some such broad policy is declared to be necessary for the present welfare of the properties and to meet the growing demands upon the company's service. There has been practically no financing or development of these interests in a constructive way for several years.

Dividends.

	Term.	Rate.	Payable.
Ark. Val. R.,L.&P. pf.	Q	1.75	June 15
Brooklyn Rapid Tran.	Q	1.5	July 1
Chicago Tel.	Q	2.	June 30
Con. G., E. L. & P.	Q	1.5	July 1
Elec. Prop. Corp. pf.	Q	1.5	June 10
Mackay Cos. pf.	Q	1.	July 1
Mackay Cos. com.	Q	1.25	July 1
Mass. Elec. Cos. pf.	S-A	2.	July 1
Mont. Pow. pf.	Q	1.75	July 1
Mont. Pow. com.	Q	0.5	July 1
Narragan. Elec. Lt.	Q	2.	July 1
N. Y. Edison.	Q	1.5	June 15
N. Ohio L. & P. pf.	S-A	3.	July 15
Roch. R. & L. pf.	Q	1.25	June 1
Va. R. & P. pf.	S-A	3.	July 10

Reports of Earnings.

VIRGINIA RAILWAY & POWER.

	1914	1913
April gross	$ 420,582	$ 398,302
Net	219,250	200,095
Surplus after charges.	90,509	81,122
Ten months' gross.	4,284,091	4,027,464
Net	2,151,783	2,015,356
Surplus after charges.	878,570	845,629

GREAT WESTERN POWER.
(and affiliated subsidiaries.)

	1914	1913
April gross	$ 220,858	$ 225,132
Net earnings	150,774	157,365
Gross income	169,350	170,196
Surplus after charges.	70,788	75,088
Balance after guaranteed dividends	58,288	62,588
Twelve months' gross.	2,718,882	2,447,752
Net earnings	1,726,420	1,427,298
Gross income	1,946,040	1,514,250
Surplus after charges.	772,607	423,435
Balance after guaranteed dividends	622,607	273,435

TEXAS POWER & LIGHT.

	1914	1913
April gross	$ 118,940	$ 82,373
Net after taxes	41,138	26,581
Surplus after charges.	18,249	11,799
Twelve months' gross.	1,313,564	1,054,622
Net after taxes.	469,047	414,548
Surplus after charges.	209,304	280,392
Balance after preferred dividends	99,054	208,467

PACIFIC POWER & LIGHT.

	1914	1913
April gross	$ 108,567	$ 99,494
Net after taxes.	58,041	37,369
Surplus after charges.	26,824	9,598
Twelve months' gross.	1,316,378	1,261,412
Net after taxes.	672,964	601,101
Surplus after charges.	311,995	300,350
Balance after preferred dividends	66,995	62,001

FORT WORTH POWER & LIGHT.

	1914	1913
April gross	$ 67,039	$ 44,473
Net after taxes.	35,734	27,945
Surplus after charges.	27,189	21,211
Twelve months' gross.	751,351	545,487
Net after taxes.	433,450	284,249
Surplus after charges.	341,486	216,241
Balance after preferred dividends	284,445	172,841

MOUNT WHITNEY POWER & ELECTRIC.

	1914	1913
April gross	$ 53,344	$ 42,513
Net after taxes.	29,687	19,782
Surplus after charges.	17,862	10,657
Twelve months' gross.	602,272	467,281
Net after taxes.	329,846	247,459
Surplus after charges.	187,946	137,959

CLOSING BID PRICES FOR ELECTRICAL SECURITIES ON THE LEADING EXCHANGES AS COMPARED WITH THE PREVIOUS WEEK.

	June 1.	May 25
American Tel. & Tel. (New York)	122½	121¾
Commonwealth Edison (Chicago)	135	134
Edison Electric Illuminating (Boston)	252	252
Electric Storage Battery common (Philadelphia)	52	52
Electric Storage Battery preferred (Philadelphia)	52	52
General Electric (New York)	148¾	147
Kings County Electric (New York)	120	120
Manhattan Transit (New York)	⅝	¾
Massachusetts Electric common (Boston)	11½	11
Massachusetts Electric preferred (Boston)	58	60
National Carbon common (Chicago)	110½	108
National Carbon preferred (Chicago)	117½	118
New England Telephone (Boston)	134½	134½
Philadelphia Electric (Philadelphia)	25½	25⅝
Postal Telegraph and Cables common (New York)	82	82
Postal Telegraph and Cables preferred (New York)	68½	67½
Western Union (New York)	61⅞	66
Westinghouse common (New York)	77	72¾
Westinghouse preferred (New York)	123	114

PERSONAL MENTION.

MR. F. C. BEVANS has been appointed city manager at Mulberry, Kans., and will supervise the municipal light plant, as well as other municipal utilities.

MR. B. J. JONES, general manager of the Steubenville Traction & Light Company, Steubenville, O., has resigned. His successor has not yet been announced.

MR. W. CRIGHTON HARRIS has resigned from the engineering firm of Crighton Harris & Company to become chief engineer of the Titan Storage Battery Company, of Newark, N. J.

MR. D. W. ELLIS, a civil engineer, has been appointed to the newly created position of city manager of Osage City, Kans. Mr. Ellis will have charge, among other things, of the municipal electric light plant.

MR. S. B. IRELAND, who has been in charge of electric light and power properties at Fremont, Neb., has been appointed manager of the Bartlesville (Okla.) Interurban Railway Company, a subsidiary of Cities Service Company.

DR. GANO DUNN, president of the J. G. White Engineering Corporation, received the honorary degree of Master of Science at the celebration of the fiftieth anniversary of the founding of the School of Mines of Columbia University, New York City, on May 29.

MR. NEWTON W. BOLEN, general superintendent of the Public Service Electric Company, Newark, N. J., was the guest of honor at a recent dinner given at the Krueger Auditorium in that city. The occasion was the tenth anniversary of Mr. Bolen's connection with the company.

MR. A. H. FORD has resigned the presidency of the Birmingham (Ala.) Railway, Light & Power Company to become vice-president and general manager of the Cumberland Power & Light Company, effective June 1. Mr. Ford will have his headquarters at Portland, Me.

MISS MARIE J. RUSSELL, of the Kansas City Electric Light Company, will leave in July for a trip through the East, on which she will inspect the facilities and methods of other companies in new-business work. Miss Russell is in charge of the specialty or new-business department of the company.

MR. T. C. RINGGOLD, sales manager of the Central Electric Company, Chicago, Ill., was a speaker at the meeting of the Executive Club of Chicago on May 29. Mr. Ringgold gave many valuable suggestions relative to the conduction of a sales department of a large organization.

MR. C. W. GALLUP has recently been appointed to the territory north and south from North Dakota to Texas, and east and west from Kansas City to Pittsburgh by the Best Electric Company, Pittsburgh, Pa. Mr. Gallup was formerly with the General Electric Company.

MR. NELSON B. HAZELTINE, formerly Philadelphia district sales manager for the Adams-Bagnall Electric Company, has joined the sales organization of the Electric Storage Battery Company. Mr. Hazeltine will have headquarters at the New York office of the company.

MR. THOMAS E. MURRAY, vice-president of the New York Edison Company, and MR. PHILIP TORCHIO, electrical engineer of the company, are in Berlin, Germany, where they were entertained last week by Mr. Siegmund Bergmann, general manager of the Bergmann Elektrizitaets-Werke Aktien Gessellschaft.

MR. J. E. ERICKSON has recently accepted a position with the Western Conduit Company at Youngstown, O. Mr. Erickson previously had been connected with the Erner Electric Company, of Cleveland, and previous to that with the Thomas G. Grier Company of Chicago. Mr. Erickson has the supervision of the Cleveland territory and will continue his residence in that city.

MR. JAMES CLARK, JR., head of the James Clark, Jr., Electric Company, Louisville, Ky., caught his share of the 500 bass which were taken by the members of the Ananias Club, just back from a fishing trip to Middlebass Island, Lake Erie. The club is thirty-eight years old and seventeen of the twenty members were in the party this spring. Most of the members inherited their memberships in the club from their fathers, there being only about four or five of the charter members still living.

MR. E. K. JAMES, formerly with the Landers, Frary & Clark Company, of New Britain, Conn., has become associated with the Best Electric Company, of Pittsburgh, Pa., and will travel the territory north and south from Massachusetts to Georgia, and east and west from the Atlantic Coast to Pittsburgh. Mr. James made quite a success with the Landers, Frary & Clark Company and the Best Electric Company believes it has secured a valuable addition to its forces.

MR. B. C. EDGAR, assistant general superintendent of the Columbus Railway, Power & Light Company, has resigned to accept the position of general superintendent of the Nashville Railway & Light Company, of Nashville, Tenn. The latter property is operated by the Clark Management Corporation, which also controls the Columbus interests which Mr. Edgar is leaving. His successor is Mr. W. C. CAMPBELL, who has had extensive experience with railway and light properties in the Eastern States and on the Pacific Coast.

MR. GEORGE C. KEECH, district sales manager of the Cooper-Hewitt Electric Company, of Chicago, addressed the Detroit-Ann Arbor section meeting of the American Institute of Electrical Engineers on May 29. This was a joint meeting with the Industrial Electrical Engineering Society of Detroit. The address was illustrated with about a hundred lantern slides, and after discussing the special electrical and mechanical features of industrial lighting with mercury-vapor lamps, Mr. Keech described their application to illumination in foundries, round houses, printing establishments, plate-glass manufactories, drafting rooms, clothing manufactories, silk mills; in inspection work, such as razor blades, sugar, piano keys, and steel rails, and in motion picture and commercial and portrait photography.

MR. FREDERICK W. DOOLITTLE has been appointed director of the Bureau of Fare Research of the American Electric Railway Association, which bureau was organized on May 1, 1914. This bureau will make a detailed study of the factors affecting rates of passenger fares in street and interurban railways; it will also gather statistical information and various operating data now being received by the secretary of the Association, and assemble and compile financial operating results of member companies of the Association; from these data a study will be made of conditions influencing the rates of fare and operating expenses of electric railways. Mr. Doolittle is a native of Hopkington, Iowa, and a graduate of Lenox College. He has also received advanced degrees from Princeton University and the University of Colorado. He was connected for a time with the Boston Consolidated Mining Company, of Bingham, Utah, and the Consolidated Coal & Coke Company, of Dacoma, Colo.; he was instructor of mechanics and hydraulics at the University of Illinois for one year and for another year was in charge of structural engineering work at the University of Colorado; for nearly three years he was assistant professor of mechanics at the University of Wisconsin. At various times he has been closely associated with the engineering departments of various railroad companies, and for several years was special investigator for the Railroad Commission of Wisconsin. During the last few months he helped organize the staff of the Illinois Public Utilities Commission.

OBITUARY.

MR. CHARLES EVERETT PETTEE, for many years connected with the sales department of the Westinghouse Machine Company and since 1908 with the G. M. Herman Pneumatic Machine company, of Zelienople, Pa., died at his home in Pittsburgh, Pa., on May 21, after a long illness. He was 67 years of age.

MR. WILLIAM H. POVEY, superintendent of the lighting department of the Board of Public Works, of Newark, N. J., died of apoplexy at his home in that city on May 26. Mr. Povey was 54 years of age and had occupied the office of superintendent for 17 years. He is survived by a wife, two sons and a daughter.

MR. JOSEPH ADDISON SANDFORD, JR., electrical engineer for R. Thomas & Sons Company, East Liverpool, O., died in that city on May 21 of appendicitis. Mr. Sandford was well known as an expert on high-voltage insulators. He was born in Ware, Mass., October 17, 1879, and was a graduate of Worcester Polytechnic Institute. He leaves a widow and one son. Funeral services were held at his late residence in East Liverpool, after which the body was taken to Ware for burial.

SIR JOSEPH WILSON SWAN died in London, England, on May 27. He was born at Sunderland on October 31, 1828. He was early engaged in chemical work and the production of photographic plates. He produced the first rapid dry plates. He became interested in electrical phenomena and devoted a great many years to the perfection of the incandescent lamp, being credited with a number of inventions in this connection. In 1860 he produced an incandescent lamp having a filament made of carbon. This lamp did not prove at the time a commercial success, but in the year following Edison's exhibition of electric lighting at Menlo Park with carbonized bamboo filaments, Swan gave a public exhibition at Newcastle of incandescent lighting on a large scale, using carbonized filaments of cotton thread.

FOREIGN TRADE OPPORTUNITY.

[Where addresses are omitted they may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., and at the branch offices of the Bureau, 315 Customhouse, New York, N. Y., 629 Federal Building, Chicago, Ill., Association of Commerce Building, New Orleans, La., and 310 Customhouse, San Francisco, Cal. Apply for addresses in letter form, giving file numbers.]

NO. 13,094. ELECTRIC LAMPS.—A commission merchant in an important trade center of the Near East desires to receive catalogs and prices of electric lamps of all kinds. Prices must be quoted c. i. f. certain city, and correspondence should be in French. Terms, half cash with order, balance against documents.

NEW PUBLICATIONS.

IRON AND STEEL REPORT.—The Association of Iron and Steel Electrical Engineers has published a bound volume containing the proceedings of the 1913 convention which was held in New York City last September.

ELECTRIC POWER CLUB.—The Electric Power Club has issued the second edition of the booklet containing the standardization rules, constitution and list of members. The secretary is C. H. Roth, 1400 West Adams Street, Chicago, Ill.

DATES AHEAD.

Oregon Electrical Contractors' Association. Annual meeting, Portland, Ore., June 8-9. Secretary, F. C. Green, Portland, Ore.

American Society of Mechanical Engineers. Spring meeting, St. Paul, Minn., June 16-19. Secretary, Calvin W. Rice, 29 West Thirty-ninth Street, New York, N. Y.

American Institute of Chemical Engineers. Sixth semi-annual meeting, Troy, N. Y., June 17-20. Secretary, J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y.

Michigan Section, National Electric Light Association. Annual convention cruise leaving Detroit June 17, for the Thousand Islands and intermediate points, returning June 20. Secretary, Herbert Silvester, 18 Washington Boulevard, Detroit, Mich.

Minnesota Electrical Contractors' Association. Annual convention, St. Paul, Minn., June 22. Secretary, G. M. Jones, 14 North Seventh Street, Minneapolis, Minn.

American Institute of Electrical Engineers. Thirty-first annaul convention, Cadillac Hotel, Detroit, Mich., June 23-26. Secretary, F. L. Hutchinson, 29 West Thirty-ninth Street, New York, N. Y.

Canadian Electrical Association. Annual convention, Montreal, Canada, June 24-26. Secretary, H. G. Martin, Toronto, Ont.

American Society for Testing Materials. Seventeenth annual meeting, Atlantic City, N. J., June 30-July 4. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

National Electrical Contractors' Association of the United States. Annual convention, Cadillac Hotel, Detroit, Mich., July 15-18. Secretary, G. H. Duffield, 40 Martin Street, Utica, N. Y.

Ohio Electric Light Association. Annual convention, Cedar Point, O., July 21-24. Secretary, D. L. Gaskill, Greenville, O.

New England Section of the National Electric Light Association. Sixth annual convention, Narragansett Pier, R. I., September 2-4. Secretary, Miss O. A. Bursiel, 149 Tremont Street, Boston, Mass.

Electric Vehicle Association of America. Fifth annual convention, Philadelphia, Pa., October 19-21. Secretary, Albert Jackson Marshall, 29 West Thirty-ninth Street, New York, N. Y.

With the Electrical Manufacturers

Rome Wire Company, Rome, N. Y., has recently issued a very attractive calendar for June, 1914, the illustration being an excellent color-print of a summer girl.

Efficiency Sales Company, 42 Broadway, New York, is mailing a card illustrating and describing Mohawk fire-alarm switchboards which are designed to control fire-alarm systems from lighting circuits and to charge batteries.

Dossert & Company, New York, N. Y., were represented at the National Electric Light Association convention at Philadelphia last week, by H. B. Logan, president, with reception headquarters at the Bellevue-Stratford Hotel.

Munning-Loeb Company, Matawan, N. J., has recently issued bulletin No. 500, devoted to a description of brushes for use in electroplating, buffing, etc. This bulletin contains information on brush manufacture, selection and operating characteristics.

W. N. Matthews & Brother, St. Louis, Mo., are sending out new circular matter pointing out the advantageous features of the Matthews fuse switch. Among the features particularly emphasized are safety, economy and improved service.

Delta-Star Electric Company, Chicago, Ill., is distributing a 36-page bulletin devoted to a description of its new steel-tower type outdoor high-tension substations. The bulletin contains 36 illustrations and will be valuable to those interested in this line of work.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., recently sold an electric motor to General Villa, the Mexican Constitutional military leader who has for some months been arousing interest on both sides of the Rio Grande. The motor is to be used for driving a water works.

Rushmore Dynamo Works, Plainfield, N. J., has secured several large contracts abroad. S. W. Rushmore went to Italy, France and England a few months ago and closed contracts amounting to $150,000. He left again a week ago for Germany to close a $100,000 contract for equipment for a lighting plant.

Roller-Smith Company, 203 Broadway, New York City, has prepared bulletin sheet No. 85, which deals with the Hartmann & Braun vibrating-reed frequency meters. These instruments are made in several types for switchboard or portable use. Combined with some of them is an auxiliary frequency-variation alarm.

Newby Manufacturing Company, Youngstown, O., recently incorporated with a capital stock of $10,000 by William Newby, M. D. Kleinzahler, R. E. Brasher and Harry and A. B. Livingstone, is planning to erect plant for the manufacture of porcelain insulators, upon which it controls patents, and also a line of similar goods.

Standard Electric Company, Cincinnati, O., has issued two new bulletins. Of these, No. G-7 supersedes No. G-6 and describes and illustrates the latest types of Standard high-power, ball-bearing, portable electric grinders. Bulletin No. V-9 supersedes No. V-8 and is devoted to Standard universal, high-power, portable electric drills.

The Forbes Company, Philadelphia, Pa., has recently issued bulletin No. 14-H illustrating and describing its electrically, gas and steam-heated water sterilizers. These heaters are designed to raise water to the boiling point and to quickly cool it. Numerous diagrams of these sterilizers are shown, as well as various systems of distribution and views and data on actual installations.

The Wells-Liddell Company, which was recently organized at Lomax, Ill., has begun installing machinery and apparatus in its factory building. This company is preparing to manufacture both wireless telegraph and telephone equipment. Its wireless telephone is said to embody original features which permit distinct and reliable conversation over considerable distances.

The Electric Controller & Manufacturing Company, Cleveland, O., has issued in a very attractively illustrated booklet form a reprint of an article by its Mr. H. F. Stratton that was published in the December, 1913, issue of the *Engineering Magazine*. It is entitled "Lifting the 130,000,000-Pound Quebec Bridge" and gives an excellent account of the electric hoisting and control equipment used on this important engineering structure.

United Ice Improvement Company, 50 Church Street, New York City, has prepared a well written booklet of 22

pages giving a practical talk on refrigeration by W. Everett Parsons in very simple language. A technical discussion of means for improving the efficiency and capacity of artificial-ice plants points out the value of the Parsons "Quick-Freeze" system. The company is prepared to send copies of this booklet to any one interested in the manufacture of ice.

Holtzer-Cabot Electric Company, Brookline, Mass., has begun the erection of a new factory building at Amory Street, Roxbury, Mass. This building will be a large structure, six stories high, and will be of modern construction and equipment throughout. Ground was broken on May 21 with impressive ceremonies, in which President Holtzer and other officials of the company participated. Mr. Holtzer made a brief address reviewing the development of his electrical business which he began in Brookline in 1875.

Apple Electric Company's plant at Dayton, O., was almost completelv destroyed by fire on the morning of May 27, part of the buildings being saved only after the entire fire department of the city was called out to fight the blaze. The origin of the fire has not yet been discovered. Several other small buildings were destroyed, the total damage done by the fire amounting to nearly $100,000, according to careful estimates. The company manufactures electric automobile self-starters, storage batteries and similar electric goods. About 80 per cent of the loss is covered by insurance.

W. R. Ostrander & Company, 22 Dey Street, New York City, had an exhibit that attracted much favorable attention at the recent exhibition of fire-alarm apparatus and protective devices held in the Woldorf-Astoria Hotel, New York City, under the auspices of the National Association of Manufacturers. It was a complete demonstration of the system prescribed by the New York Fire Prevention Bureau and consisted of electromechanical gongs and manual type selective-ringing fire-alarm boxes. The energy was furnished from storage batteries automatically charged from a lighting circuit. This system has been favorably received by a large number of factory owners throughout the country.

George Cutter Company, South Bend, Ind., has published bulletin No. R-3,196, describing and illustrating the features of a new line of Cutter streethoods for series and multiple circuits, adaptable for use with all sizes and types of incandescent lamps, including the new Type C or gas-filled Mazda lamp. This bulletin deals with the most modern systems of street illumination and in addition to the descriptive matter relating specifically to the new fixtures, contains considerable information of value to anyone interested in the use of the modern incandescents for street lighting or for multiple circuits. Copies of the bulletin will be furnished to those interested upon request.

Wagner Electric Manufacturing Company, St. Louis, Mo., announces the opening of a sales office at suite 524 University Block, Syracuse, N. Y. This office will be in charge of J. W. Bryant, who for some time has been identified with the sale of Wagner apparatus in that territory. The company has recently issued a miniature edition of its bulletin entitled "A Manual of Electrical Testing." This new edition is 5x3.75 inches and differs from the original bulletin only in size. As this manual is a well written, concise and valuable treatise on electrical testing, the miniature edition should prove of great convenience to anyone who desires to carry such a manual in his pocket.

The Babcock & Wilcox Company, New York City, has recently issued an 80-page cloth-bound book devoted to steam superheaters. The first part of this publication is devoted to a history of the use of superheated steam and to the properties and advantages of superheated steam. The remainder of the publication is devoted to a description of the company's superheaters and to the methods of applying them to different types of boilers. The book is well illustrated by excellent half-tone reproductions of views of numerous installations and of wash drawings of the various parts of the company's superheaters. The section devoted to the properties and advantages of superheated steam discusses the subject from both the theoretical and practical points of view, giving numerous formulas, tables and curves.

The Electric Storage Battery Company, Philadelphia, Pa., has published bulletin No. 146. This is a comprehensive publication dealing with the Ironclad-Exide battery for storage-battery locomotives. The requirements of a battery for this type of locomotive are set forth and comprehensive data are given of Ironclade-Exide batteries suitable for such service. The method of determining the size and capacity of battery to be used with any particular installation is given in detail with the aid of several examples. Characteristic curves for these batteries are given, as well as a table of boosting rates. Many important features to be taken into account in the selection and installation of batteries for this type of locomotive are made clear. The bulletin is well illustrated with numerous views of battery-driven locomotives, of complete batteries, etc.

The Westinghouse Machine Company, has recently issued bulletin Nos. 1054 to 1057 inclusive, dealing with the general subject of the application of the company's products to marine service. Bulletin No. 1054 is devoted to a discussion of bridge control and gives a description of the bridge control of the driving turbines installed on the collier "Neptune." This bulletin is well written, well illustrated and fully describes the method of bridge control of turbine units. Bulletins Nos. 1055 and 1056 are devoted to descriptions of the turbine installation and the reduction-gear propelling machinery of the same collier, respectively, while bulletin No. 1057 is devoted to a description of condensers and auxiliaries suitable for marine service. All of these bulletins are well illustrated and the subjects are treated in a very comprehensive yet simple manner. Bulletin No. 1058, issued by Westinghouse Gear & Dynamometer Company, is devoted to a description of Westinghouse gears and dynamometers for marine service. This bulletin is well illustrated and discusses in detail the need for a floating frame for gears in marine service.

Record of Electrical Patents.

Issued by the United States Patent Office, May 26, 1914.

1,097,636. System of Electrical Signaling. E. A. Hummel, St. Paul, Minn. An electric clock-control system.

1,097,640. Thermostatic Circuit Controller. W. L. Jacoby, assignor to The American District Telegraph Co. Thermostat short-circuits terminals.

1,097,651. Measuring Apparatus. M. E. Leeds, Philadelphia, Pa. A modified Wheastone bridge.

1,097,679 and 1,097,680. Electromagnetic Switch. W. M. Scott, Philadelphia, Pa. Control arrangement for electromagnetically operated switch.

1,097,699. Electric Alarm and Fire Escape. F. C. White, Jr., Denver, Colo., assignor of one-half to J. Thorman. A combined fire alarm and door-opening device.

1,097,736. Electrical-Receptacle Attaching Device. J. S. Stewart, assignor to A. Stewart, New York, N. Y. A sign receptacle with special terminal lamps. (See cut on next page.)

1,097,742. Double-Current Generator. F. H. Wade, Chicago, and W. E. Bauerle, Oak Park, Ill. A double-current generator having a single-phase ignition winding and a direct-current battery-charging winding.

1,097,760. Intercommunicating Telephone System. S. A. Koltonski, Boston, Mass. A key-operated intercommunicating telephone.

1,097,789. Typewriting Machine. T. Cahill, New York, N. Y. Movement of carriage obtained by electric motor.

1,097,801. Electrolytic Converter for the Transformation of Alternating Currents Into Continuous Currents. A. Heinz, Paris, France. A liquid converter having cellular aluminum and lead electrodes.

1,097,810. Driving Means for Electric Locomotives. G. Lundholm, Vesteras, Sweden. A double-crank drive.

1,097,823. Alternating-Current Motor. S. Sparrow, assignor to Wagner Electric Mfg. Co., St. Louis, Mo. A series motor with special short-circuiting brushes for use when acting as a repulsion motor. (See cut, next page.)

1,097,826. Electrolytic Cell. C. P. Townsend and E. A. Sperry, assignors to Hooker Electrochemical Co., New York, N. Y. Has subdivisions formed by fibrous diaphragm and devices for compressing the diaphragm.

1,097,861. Toll Operating Circuits. E. E. Hinrichsen and J. F. Toomey, assignors to Western Electric Co., New York, N. Y. Covers details.

1,097,867. Selector Switch for Automatic Telephone-Exchanges. F. R. McBerty, assignor to Western Electric Co. Covers details.

1,097,868. Automatic Telephone-Exchange Selector. F. R. McBerty, assignor to Western Electric Co. A modification of 1,097,867.

1,097,871. Electric Flashing Device. T. J. Murphy, Rochester, N. Y., assignor of one-fourth to J. P. B. Duffy. A rotating arc device.

1,097,872. High-Tension Device. T. J. Murphy, Rochester, N. Y., assignor of one-fourth to J. P. B. Duffy, Rochester, N. Y. Electrodes for wireless-telegraph system mounted to rotate in a magnetic field.

1,097,873. Electric Oscillator. D. M. Palmer, Los Angeles, Cal. A magnetic vibrator.

1,097,883. Roller Contact for Electric Welding-Machine. K. Schmarje, assignor to Thomas Electric Welding Co., Lynn, Mass. A hollow roller contact for electric welding machine having water-cooling means.

1,097,884. Automatic Alarm Lock. M. Sherman, New York, N. Y. Covers details of contacts.

1,097,895. Spot Welding. E. Thomson, assignor to Thomson Electric Welding Co. Comprises a wheel having welding electrodes and seated on a current-supplying plate.

1,097,906. Lamp Cleaner. J. O. Beauchesne, Fall River, Mass. A pair of brushes is mounted at end of adjustable rod.

1,097,910. Electric Flash Light. W. Broad, Beaver Falls, Pa. Covers details of contact device and mechanical features of construction.

1,097,922. Advertising Device. F. H. Feraud, assignor to Edward S. Briggs, St. Louis, Mo. An electric lamp with no visible means of supplying current.

1,097,927. Automatic Telephone-System Selector. F. R. McBerty, assignor to Western Electric Co. A selector switch, the terminals of which are transversed by traveling brushes.

1,097,960. Telephone Repeating Device. D. H. Wilson, New York, N. Y. Covers details of circuits.

1,097,964. Fuse. W. C. Banks, New York, N. Y., assignor to Northwestern Construction Co., New York, N. Y. An inclosed fuse, the fuse member of which is bolted to terminals.

1,097,974. Receiver for Wireless Communication. W. Harrison, Brooklyn, N. Y. Includes a number of antennae of different oscillation constants, each antenna having its own detector.

1,098,015. Selective Switch System. F. E. Case, assignor to General Electric Co. Controls circuits of a railway motor having shunt and series windings.

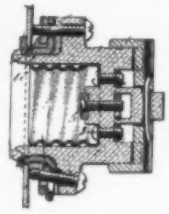
1,098,052. Magneto Machine. E. Podlesák, Tiffin, O. Covers details.

1,098,084. Automatic Transmitter for Telegraphic Signals. H. B. Croydon, assignor to Creed, Bille & Co., Ltd., Croydon, England. Employs a perforated tape.

1,098,085. Pistol Flashlight. J. Block, assignor to Interstate Electric Novelty Co., New York, N. Y. A trigger-operated pistol flash-light toy.

1,098,093. Spark-Plug. R. R. Brown, Belvidere, Ill., assignor of one-half to W. S. Brown. Covers details.

1,098,112. Signaling System for Electric Railways. A. D. Hughes and T. H. Hertzog, Washington, Pa. A trolley-operated signaling system having contact devices suspended above trolley wire.

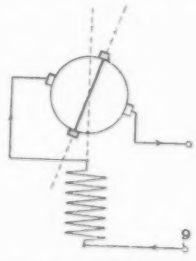


1,097,736.—Receptacle Attaching Device.

1,098,138. Pantograph Trolley. S. B. Stewart, Jr., assignor to General Electric Co. A spring-operated pantograph.

1,098,134. Motor Controller. F. T. Taylor, assignor to The Cutler-Hammer Mfg. Co., Milwaukee, Wis. A combined shunt-motor starting rheostat and field controller.

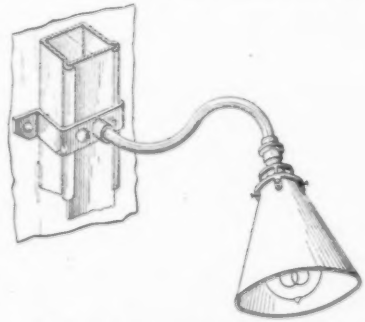
1,098,159. Means for Supporting Electric Devices. G. A. Lutz, New York, N. Y. Special lamp-fixture supporting means for use with metal molding. (See cut.)



1,097,823.—Alternating-Current Motor.

1,098,192. Electric Railbond. B. H. Thomson, North Adams, Mass., assignor of one-half to G. Wallace. Conducting pins inserted in longitudinal recesses of rails, the pins being under the compression of a spring.

1,098,204. Current-Distributing Network. G. Wolff, Hermsdorf, assignor to Bergmann-Elektricitäts-Werke, Aktiengesellschaft, Hermsdorf, Germany. A sectionalized cable having a neutral conductor in neutral point of section.



1,098,159.—Electric-Lamp Support.

1,098,211. Electric Sign. W. W. Arnold, Hamilton, O. Has a number of feeders at right angles and contact devices for each feeder.

1,098,214. Spark Plug with Priming Device. I. V. Beam, Elmira, N. Y., assignor of one-half to N. D. Doxey. Has a special valve in a longitudinal passage.

1,098,226. Magneto. W. Casey and I. Lesses, Kingston, Ontario, Canada, assignors of one-half to John J. Harty. Both magnet structure and armature rotate.

1,098,231. Electric-Accumulator Plate. G. O. Davies, Harrow, England. Plate mounted on wood frame.

1,098,242. Electric-Horn Switch. J. E. Foulks, Jr., New York, N. Y. Switch contacts mounted on steering wheel.

1,098,246. Housing for Electromagnets. E. Gengenbach, New York, N. Y. A metal housing with securing flanges.

1,098,291. Swivel Connector. G. W. Oakes, Kokomo, Ind. Has a pivoted joint in the conductor which is inclosed in insulating tube.

1,098,317. Incandescent Electric Headlight. C. W. Dake, assignor to Pyle-National Electric Headlight Co., Chicago, Ill. Lamps are mounted near the edge of a parabolic reflector.

1,098,345. Generation of Polyphase Alternating Electric Currents of Varying Frequencies. W. P. Durtnall, Herne Bay, England. Involves the use of a motor-generator deriving current from constant frequency alternator.

1,098,357. Process of Treating Wood for Storage-Battery Separators. J. M. Skinner, assignor to Philadelphia Storage Battery Co., Philadelphia, Pa. Consists of immersion in sodium sulphide and washing.

1,098,361. Fly-Wheel Magneto for Explosive Engines. E. S. Huff, assignor to Henry Ford, Detroit, Mich. Permanent magnets mounted on fly wheel.

1,098,362. Burglar Alarm. T. H. Nelson, Chicago, Ill. A window contact device.

13,739. Portable Rheostat for Welding Apparatus. J. M. Yount, San Francisco, Cal., assignor of one-third to E. S. Brannaman and one-third to T. Finigin. Rheostats mounted on truck.

Patents Expired.

The following United States and electrical patents expired June 1, 1914.

583,452. Electric Switch. T. H. Brady, New Britain, Conn.

583,524. Underground Railway-Conduit. A. G. Wheeler, New York, N. Y.

583,575. Collector for Electric Railways. L. J. Hirt, Brookline, Mass.

583,586. Electric Igniter for Gas Engines. G. Westinghouse, Jr., and E. Ruud, Pittsburgh, Pa.

583,589. Electric Connector. F. E. Austin, Hanover, N. H.

583,618. Vacuum Electric-Arc Furnace. H. Eldridge, G. H. Wright and D. J. Clark, Galveston, Tex.

583,622. System of Electrical Distribution. P. M. Heldt, Chicago, Ill.

583,630. Electric Gas-Lighter. J. Y. Parke, Philadelphia, Pa.

583,644. Electric Burglar and Fire Alarm. J. R. Fraser, Jr., Chicago, Ill.

583,718. Electric Water-Filter. W. L. Teter, Philadelphia, Pa.

583,787. Electric Insulator. W. Christie, San Francisco, Cal.

583,810. Secretary Battery. J. H. May and F. King, London, England.

583,820. Fusible Socket for Electric Lamps. S. H. Russell, Watsonville, Cal.

583,880. Electric Brake. R. M. Hunter, Philadelphia, Pa.

Electric Vehicle Section

NEW ENGLAND ELECTRIC VEHICLE CONVENTION.

Boston, Mass., May 18-20.

A highly successful convention of central stations, electric-vehicle manufacturers and allied interests was held at Boston, Mass., May 18 to 20, with headquarters at the Engineers Club. The meetings were held under the auspices of the New England Section of the Electric Vehicle Association of America and the Electric Motor Car Club of Boston. Nine papers were presented and discussed during the regular sessions, with the addition of an open business forum in which the commercial side of the vehicle-exploitation problem was freely discussed. The convention closed with an outing at the Relay House, Bass Point, Mass., at which a shore dinner and informal outdoor sports were enjoyed by all who were able to be present.

The Problem of Terminal Freight Congestion and its Solution.

At the session on May 18, which was a regular meeting of the New England Section of the Electric Vehicle Association, Fred A. Hortter, car accountant of the Boston & Maine Railroad, Boston, Mass., discussed the general principles of freight handling on railroads at their city terminals, pointing out the evils of protracted delays in withdrawing shipments from stations and emphasizing the inefficiencies of modern trucking methods between business houses and the railroad receiving points. A week's observations in Boston at the North Station showed an average horse-vehicle load of but 0.36 ton in handling a total weekly traffic of 22,146 tons.

Electric-Vehicle Progress.

President Day Baker of the Electric Motor Car Club of Boston opened the meetings of May 19. He said that 1,000 electrics are now in use on the streets of Massachusetts and during the past year electric trucks have shown a larger percentage increase in registrations than gasoline machines. The express companies now have nearly 50 trucks in Boston service; Boston breweries are supplanting their gasoline machines with electrics and there are eight commercial-car manufacturers represented in Boston, with ten passenger-car agencies. People are realizing more and more the pleasure of driving an electric car.

Mr. Baker then announced that the following new members have been elected members of the Electric Motor Car Club of Boston. E. Y. Stimson, Anderson Electric Car Company; Louis R. Abell, consulting traction engineer, Boston; H. A. Fay, Service Recording Company, Boston; F. T. Moore, C. F. Goodrich Company, Boston.

Co-operation.

William H. Blood, Jr., of Stone & Webster, past-president of the Electric Vehicle Association of America, then addressed the convention. He stated that he knew of no association in which more real action takes place than in the E. V. A., and commended the co-operative spirit shown by manufacturers, central stations, accessory and tire houses, battery makers, garage men, owners of cars and trucks and the technical and trade press. The Boston Edison Company in particular has set the pace for New England, displacing practically all its horses by electric vehicles and making helpful rate reductions.

In the general discussion which followed, D. C. Tiffany, Ohio Electric Car Company, Boston, voiced the importance of reasonable rates for battery charging. He pointed out that because a small central station in Manchester, Mass., bills electricity to vehicle owners in that fashionable summer resort at 25 cents per kilowatt-hour, he was unable to close the sale of a passenger car. Col. E. W. M. Bailey, S. R. Bailey & Company, Amesbury, Mass., cited a parallel case in which a small central station refused to permit the installation of a rectifier outfit for a private garage, but finally after much persuasion, consented to supply energy to a motor-generator set furnished by the car owner. J. S. Codman, S. R. Bailey & Company, Boston, said that while the cost of energy is admittedly very high in Manchester, it is in part due to the fact that the company purchases electricity from another central station of moderate size, and also to the fact that the Manchester company is run chiefly to furnish lighting service for wealthy cottagers, and usually at a considerable yearly loss. He thought that there is a field for genuine co-operation in such cases, however.

Converse D. Marsh, Bates Advertising Company, New York, urged that the electric vehicle interests give special consideration to interesting consulting engineers in the development of the industry. The speaker's experience had been that in many cases electrical engineers practicing in other fields look upon the electric vehicle as a joke, and do not appreciate its capabilities. The idea is too prevalent that the designs of 10 or 15 years ago are more or less in vogue. He advocated carrying advertising in the pages of the American Institute of Electrical Engineers' publications, in which plain facts about the electric vehicle viewed from the technical standpoint would be set forth in a succinct and interesting manner for the benefit of the profession as a whole no less than the vehicle industry. Contrary to the opinion of many able engineers who have not kept up with electric-vehicle progress, the vehicle motor is anything but a toy; batteries are of larger capacity and more efficient than in the early days, and in point of speed and reliability, little is to be desired.

Mr. Baker referred to a recent drive with his eight-year old electric runabout as an instance of the machine's dependability. On May 17 he drove the machine 46 miles over hilly roads at an average speed of 13.2 miles per hour, having only 30 cells of battery. Few people as yet realize the value of the electric passenger car in suburban travel.

Charles B. Burleigh, General Electric Company, Boston, speaking from many years' experience as a sales engineer, said that the central station still fails to realize the benefits of electric-vehicle service and the profits of charging batteries in off-peak hours. The needs of the tourist must be considered, even though he is a future prospect. More attention to charging facilities should be given. The flat-compounded exciters now general in station service are not primarily adapted to battery charging and the attention of engineers designing stations should be given to the matter. Ninety-nine per cent of the time, battery charging can be done off the peak. There is a tendency for central stations to expect too much of the manufacturers, and a more alert attitude toward the

electric vehicle will bring its own reward.

Colonel Bailey demurred at the last speaker's views, stating that on his tours with an electric vehicle he had found central stations universally cooperative, although in many cases makeshifts had to be resorted to for charging, and too often time was lost in waiting for someone in authority to push the work. In Ashtabula, O., the local central station went so far as to run a 1,200-kilowatt generator in order that an exciter might be operated for the battery-charging service. The colonel pointed out that in reality it is a very simple matter to get a charge where a high-rate boost is desired, as the instruments on the car can be used in place of any measuring devices in the station, and there is no real need of a recording wattmeter, since the service rendered rather than the actual input in kilowatt-hours, may be looked upon as the basis for a price.

Albert Weatherby, Boston, said that many central stations have invited him to send a demonstration car to their towns for a month, offering garaging and other facilities without cost. E. S. Mansfield, Boston Edison Company, cited the interest of the National Electric Light Association in electric vehicles, and outlined the co-operation of that organization with the Electric Vehicle Association of America. David W. Beaman, New Bedford Gas & Edison Light Company, described a new electric garage recently completed by his company, the building being 100 feet by 60 feet in plan, with a front of Indiana limestone to harmonize with the local office building. This plant will house about 30 cars in the near future, and the company now operates nine electric vehicles in its own service.

W. M. Thayer, Hartford, Conn., Electric Light Company, then described the local system of battery-exchange service. The Hartford company rents the battery service of commercial trucks, the purchaser owning the rest of the equipment, the charges being on a mileage basis and running from about $30 a month for a 750-pound wagon to about $100 a month for a five-ton outfit. Those prices include all battery service, charging and care, and 47 trucks are now in use today on this system, with nine more on order. The company also earns from $65 to $75 per week by the rental of ignition batteries for gasoline cars. Approximately $200 per week is earned by the company in its battery-service department and the present daily runs total about 1,600 miles. The maximum daily run thus far has been 85 miles. One 1,000-pound car has made 55 miles per day for the last six months and another makes from 50 to 68 miles daily, of course with the battery changed once. An old boiler house is used for the battery-charging station and the principal investment aside from the batteries was $200 for jacks used in handling the cells to and from the cars. No extra feeders were required as a substation is located on the same property.

S. Fred Smith, Salem Electric Lighting Company, said that a reduction from a 4.5-cent rate for battery charging to a 3 or 3.5-cent rate is under consideration. Mr. Burleigh suggested that much good could be accomplished by a tabulation of the investment required and the returns resulting from electric vehicle business in central stations. The outlay in money to handle this is small in proportion to the benefits. Answering a question, Mr. Thayer said that the labor item is the most variable factor in the battery-exchange system. As the number of cars cared for increases, the cost should diminish. In some cases, as in the ice-cream-delivery field, a car is released in the winter and its battery can be put in service elsewhere. The Hartford company carries 1.25 batteries per car at present, and in winter figures 1.5 batteries per car. This might be cut to 1.3 batteries if charging is done at night with the battery in the truck.

A. Jackson Marshall, executive secretary of the Electric Vehicle Association, New York, said that the membership has increased from 437 to 700 within the past few months, and that 1,000 members are probable by the October convention, which will be at Philadelphia. Cut-throat tactics are being eliminated in the commercial field. The Association is arranging for the listing of charging facilities in the Automobile Blue Book of America with data as to amperage and voltage and the distance to the next charging point. Sign rentals are being reduced for charging stations from $5 to $1 minimum per year. Intensive efforts are being made to win over the gasoline garage. The publicity work includes a specially useful program of releasing two or three times a week to some 100 newspapers in different sections of the country live items regarding the electric vehicle and what it is accomplishing, with frequent operating cost data and other information.

A committee was appointed by the chair, upon unanimous vote of the convention, to wait upon Governor David I. Walsh of Massachusetts, to urge him to use his influence to prevent the passage of the bill before the Legislature increasing the cost of commercial vehicle registration.

Electric Garages and Service.

J. C. Bartlett, of the Bartlett Garage, Philadelphia, pointed out that the first garage of his organization, caring for only a dozen machines, showed a profit of about $100 per month for the electric cars housed on the premises, so it was planned to build a 100-car garage and let the gasoline cars "pay the freight" while building up the business. The new garage is 70 feet wide by 100 feet deep. A head house 50 feet deep contains show and stock rooms, shops, etc. Double the skylight area usually recommended by architects is desirable. By locating the garage in the direct-current district, charging facilities were simplified, but the concern has learned that cheap rheostats are expensive. There are 33 charging circuits, of which 24 are rated at 35 amperes, six at 65 amperes, and three at 200 amperes. Sixty-five pleasure cars and a dozen trucks are cared for. The garage never had flat-rate service. The flat rate tends to produce sulphated batteries through skimped charging by careless garage men, and the life of plates is reduced if cars are charged every night. The unit rate, in which separate charges are made for storage, delivery and energy used, tends toward careful charges and considerate use. The absolute need of hourly attention to batteries to complete the bookkeeping records insures careful charging. With the large variety of batteries and differences in use among owners, it is practically impossible to arrive at any just charge on a flat-rate basis.

A strong hand should control the garages in any city to insure proper service, fair charges and to prevent destructive competition. By a system of rates encouraging the building up of district garages the central station can do most to help the electric vehicle salesman. The cars are usually left in charge of an ignorant washer at the very time when they most need skilled attention. If these one and two-car garages could be made impossible many evils would be eliminated. The salesman is often to blame for this situation, as he is liable to canvass a neighborhood to find a garage owner who will agree to allow a charging plant to be installed, and to take care of the car. When the garage owner finds that the car does not require repairs, takes up room and is somewhat of a nuisance to him, the car is bound to suffer.

Certain points are necessary to satisfy owners. Two competent battery men are on duty at the Bartlett Garage from 6 p. m. to 6 a. m., in addition to the floor men who wash, polish and move cars. A mechanic comes on duty at 6 a. m., to make minor repairs and such adjustments as have been reported by the night force. He inspects all cars before they are sent out. "Chasers" are employed to deliver the cars to owners and act as chauffeurs when desired. These men are young and are neatly uniformed. Before leaving the

ONE OF OVER 60 G.V. ELECTRICS
IN THE SERVICE OF UNCLE SAM.
CENTRAL VEHICLE COMPANY, INC.
LONG ISLAND CITY, NEW YORK

garage each car is blown out with compressed air, brushed off and a fresh paper napkin inserted in the card case, the flower vases being filled with fresh cut flowers on stated mornings of each week. In taking out a car the chaser fills out a delivery ticket which is time-stamped when he leaves and returns, the same procedure occurring at night. The car is carefully looked over on its return and the owner notified the next day of any damages sustained on the road. Any defects developing in its running are noted by the chaser to be cared for the next morning. The car is then blown out, washed, polished and charged. Once a month each car goes through a complete shop inspection for which no charge is made. Minor repairs are attended to and billed to the owner, but if more than trifling repairs are required, they are immediately brought to the owner's attention and no work is done until ordered. A complete log book is kept of all car movements, telephone calls, mileages, etc., to which the customers have access. The truck service is similar but much of the detail is omitted.

Utility of the Electric Vehicle.

A paper on the utility of the electric vehicle by E. J. Bartlett, Baker Motor Vehicle Company, Cleveland, O., was then presented. The author recapitulated various performances of pleasure cars in recent years, pointing out that a total run of 244.5 miles had been made on the streets of Cleveland on a single battery charge, and that a Baker torpedo machine had made a mile in 42 seconds. The Boston-Chicago run of Colonel Bailey was cited as a successful example of touring and the writer set forth the excellent average speed characteristics of electric passenger cars, stating that 22 miles per hour easily can be obtained by the passenger car of lighter design and 18 to 20 miles in the heavier types. Such speeds are ample for touring purposes. Seventy-five to 100 miles per charge can now be regularly obtained. The electric passenger car no longer appeals exclusively to women. The infrequency of troubles attracts the busy man and the cost of operation is about one-third less than that of the gasoline car, with one-tenth the bother.

Speeds of commercial electric vehicles range from 7 miles per hour with the five-ton truck to 13 miles per hour for the half-ton size. Gasoline speeds run 25 per cent higher for the same size, which means heavier maintenance and depreciation. The relative reliability of horse service is 75 per cent, gasoline 85 per cent, and electricity 98 per cent. Up to a daily service of 50 miles the electric vehicle is superior to gasoline in almost all cases. A life of at least 10 or 15 years can be counted upon. Records of a large installation taken last winter showed that for every 100 "truck-days" two troubles were reported for electric vehicles against six for the gasoline cars. Out of 4,900 truck-days, 3,400 were run by electric machines and 1,500 by gasoline outfits. The total number of troubles reported was 166, of which 92 applied to the gasoline machines despite their much lower combined mileage; 43 of the electric-vehicle trouble cases were due to exhausted batteries. The earliest hour of exhausted battery report was 5 p. m. Broken chains and loose tires were the chief remaining difficulties. Nearly all the trucks had been in service at least 18 months.

Mr. Burleigh, in opening the discussion, said that the difficulty encountered in bringing the electric vehicle to the attention of the smaller central station is due to the fact that 90 per cent of the men in such plants are technically rather than commercially educated. Mr. Marshall called attention to the courses on electric vehicles planned by the Electric Vehicle Association at such institutions as Case School of Applied Science, Cleveland, and Armour Institute, Chicago. Courses are also being considered for buyers, and plans are afoot for lectures, moving pictures, etc., in different parts of the country under the auspices of the Association.

At the close of the afternoon session those attending the convention were transported to the service buildings of the Boston Edison Company, where a thorough inspection was made of the company's immense garage under the guidance of Messrs. White and Smith of the Edison Transportation Department. A steak dinner was enjoyed in the company restaurant, all the viands being electrically cooked.

The Relative Fields of Electric, Gasoline and Horse Trucks.

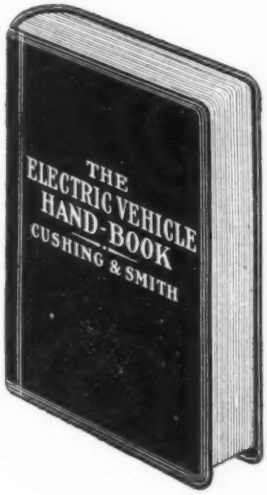
H. F. Thomson, research assistant in the Department of Electrical Engineering, Massachusets Institute of Technology, opened the evening session with an illustrated address upon the work of the Institute in the past three years in the field of highway transportation, outlining the methods of observation and showing slides of field records and curves deduced from them. Inquiries have been received from practically every state regarding this work, and six foreign countries and 100 manufacturers have displayed interest in it. Several bulletins have already been published by the Institute upon this subject, and the speaker accorded much credit to the Boston Edison Company for its financial and technical interest in the work.

The results of the investigation to date will be published by the Institute in bulletin form during the present year. In general, these show that within a two-mile radius the service of the electric vehicle is equivalent to that of the horse in cost, but that beyond this limit, the electric furnishes the cheapest service possible for a given traffic out as far as the vehicle can be operated on a single battery charge. The annual repair expenses of a 2,000-pound truck are proportional to the mileage, and may be expected to run from $40 with a mileage of 2,000 to $200 with a 10,000-mile yearly service. The total cost of maintenance per mile in modern commercial motor vehicles appears to vary about five per cent between electrics and gasoline machines. The electric is about 95 per cent reliable as compared with, say, 75 per cent in the gasoline car. In transportation cost, the labor item is the most important. Small changes in the schedule produce large variations in cost. In parcel delivery the electric vehicle is superior between two and ten miles' radius, whereas in coal distribution a [illegible] radius is about the economic limit. A five-ton coal truck can be counted upon for about 32 miles per day. The cost of electricity is only a minor item in the total analysis of truck service, and in a typical instance in the coal trade an increase in the kilowatt-hour cost of from two to four cents only increased the total expenses ten per cent.

In opening the discussion, F. B. Daggett, Commercial Truck Company of America, advanced the opinion that the cost of operating electric trucks on a scientific basis may be a good deal less than any average figures can show. He contended that the pasture is the real field of the horse and pointed to the successful use of industrial electric trucks over distances measured in yards as an indication of the possibilities in short-radius installations. The industry is as yet too young for teamsters to have learned to handle electrics most efficiently. In general, the speaker said that a one-ton electric truck can be operated 30 miles per day at a total cost of $7, compared with a $4 cost for a one-horse outfit running 15 miles per day. By an extra battery the electric truck can be run [illegible] miles per day. The cost of doubling the mileage is about 40 per cent additional, or a total of $9.80 per day for a service of 60 miles compared with a service of 60 miles compared with $16 per day for a similar service with four one-horse teams. The proper planning of street routes is of great importance. Mr. Marsh emphasized the advertising value of an up-to-date electric delivery service, and [illegible] Abell concurred with Mr. Daggett as to the importance of correct routing. [illegible] had seen the cost of delivery rise from 4.5 to 19 cents per case on account of poor routing of trips. Day Baker, General Vehicle Company, Boston, said that an examination of the private cost sheets of a large meat packer recently showed

The Only Book on the Electric Vehicle Published

"The Electric Vehicle Hand-Book"



JUST OUT

By

H. C. CUSHING, JR.
Fellow of the American Institute Electrical Engineers

FRANK W. SMITH
President Electric Vehicle Association of America

The only complete and practical book on the Operation, Care and Maintenance of all classes of Electric Vehicles, their Storage Batteries, Motors, Controllers, Tires and Accessories.

CHAPTERS

I.—Electric Vehicle Development. By William P. Kennedy, Consulting Transportation Engineer.
II.—Lead Storage Batteries; Lead Batteries, Description; Charge and Discharge Rates; Care of Storage Batteries.
III.—Care of Lead Storage Batteries; Assembling and Putting New Batteries into Condition; Charging; Charging Overnight; Emergency Charging; Inspection; Electrolyte; Cadmium Readings; Lead Burning.
IV.—Commercial Types of Lead Storage Batteries.
V.—Alkaline Storage Batteries; Description and Care.
VI.—Charging Apparatus and Charging Stations; Alternating Current Apparatus; Isolated Plants.
VII.—Measuring Instruments, Electrical and Mechanical.
VIII.—Wheels, Rims and Tires; Their Care.
IX.—The Motor, Construction and Care.
X.—The Controller, Construction and Care.
XI.—The Chassis, Its Components, Their Upkeep.
XII.—Associations and Publications Identified with the Development of the Electric Vehicle.
XIII.—Comparative Cost Data.

362 Pages, Pocket Size, Leather Cover, Price $2.00

Sent Postpaid to Any Address on Receipt of Price

Electrical Review and Western Electrician

Western Headquarters for Electrical Books

608 South Dearborn St., Chicago, Ill.

that in an extended period of service the electric trucks showed a reliability record of 92.7 per cent, compared with 72.5 per cent for the gasoline outfits, taking all interruptions into account, and including layoffs for painting.

Touring by Electric Automobiles.

J. S. Codman, of S. R. Bailey & Company, Boston, presented a paper on electric automobile touring which aroused great interest. He pointed out that the day of touring is close at hand and that the obstacles are neither many nor great. The electric has sufficient speed for all reasonable requirements, and tours show that rough, muddy and hilly roads are not real obstactles. The runs of Colonel Bailey from Boston to Burlington, Vt., and from Boston to Chicago last fall were described at length. The latest remarkable trip in an electric automobile was made between Boston and New York by a Bailey car on May 14 and 15. New York was reached in less than 24 hours from the start, the actual time being 23 hours, 9 minutes and the distance, 247.8 miles. The total actual running time on the road was 10 hours, 52 minutes, and the schedule speed through the various sections ranged from 18.9 to 26 miles per hour. Five boosting charges were given the battery, the total boosting time being 10 hours, 23 minutes. The total ampere-hours for the trip was 753, or 3.04 ampere-hours per car-mile. All the experience of the author shows that road speeds of 20 miles per hour can be maintained without difficulty by the Bailey car and that the question of local charging facilities is the only real obstacle to very satisfactory touring. The Boston-Chicago tour of Colonel Bailey covered 1,305.2 miles and was made in 83 hours, 30 minutes running time, at an average road speed of 15.6 miles per hour, the local roads in the Middle West being heavy with rain and mud.

Although a battery cannot be filled as quickly as a gasoline tank, the delay is not great, if proper facilities can be obtained. Boosting a battery at high current rates is perfectly practicable today. The Edison battery is notable in this respect, and even the lead battery can be charged without injury at much higher rates than was formerly thought possible if only proper care is taken to reduce the rate before the gassing point is reached. Mr. Codman said that on one occasion he had himself boosted a battery at 200 amperes for one hour. This was a battery of Edison A-6 cells rated at 45 amperes normal current and it absorbed enough in that hour charge to run the machine 50 miles. On this occasion the cable was passed through the window of a central station and conected directly upon the exciter bus, with little loss of time. In touring, the ampere rate obtainable is generally low; public charging stations are few and far between, and when found are as a rule equipped with a hopelessly inadequate 30 or 40-ampere rectifier. On the other hand, the local central station is generally unprepared for charging service, and it is impracticable to spend an hour getting ready for a half-hour's boost. What is needed is apparatus all ready for use and someone about the station who knows what ought to be done. Even in Massachusetts only 53 towns out of over 300 supplied with central-station service are provided with charging stations and there are only 28 towns where more than 50 amperes can be obtained.

It would certainly seem that where there is a town with no public charging station capable of giving an adequate boost, at 100 amperes minimum, and 125 volts, the electric light company itself should have ready for service an equipment connected with the exciter and consisting of a switch, fuses, and terminals for connecting to the cable and charging plug which every motorist should himself carry. A cheap resistance coil for controlling the current is also desirable, but even this is needless when the Edison battery is used. The instruments on the car itself can be used for any necessary measurements. Such an outfit would be very inexpensive. The author closed with quotations from an editorial on touring by electric automobile which appeared in the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN of October 4, 1913, which emphasized the simplicity of the necessary co-operation from the central-station standpoint.

The discussion was opened by Mr. Abel, who advocated the co-operation of the National Electric Light Association in supplying central stations with charging connections at a lower cost than by single purchases. Mr. Marsh called attention to the possibilities of using photographs of the simple charging apparatus needed among central stations. S. Fred Smith urged the more general adherence of vehicle owners to the standard plug design of the E. V. A. Mr. Marshall said that the American Institute of Electrical Engineers has adopted the standard plug, and that the International Electrotechnical Commission now has it under consideration.

J. W. Cook, Electric Storage Battery Company, Boston, cited the possibilities of boosting lead batteries at high rates of charge. If a battery is exhausted, 50 per cent of its charge can be put in during the first hour, and in two hours two-thirds of the capacity can be put in. By charging on a constant-voltage basis, 90 per cent of the charge can be put in in three hours. P. E. Kelley, Philadelphia Storage Battery Company, Boston, concurred with Mr. Cook. F. B. Neely, Boston, said that in boosting a lead battery it is convenient to charge in amperes at the rate indicated by the reading on the ampere-hour meter; that is, if the meter shows 100 ampere-hours taken out of the battery, the cells can be charged at 100 amperes, reducing to 90 amperes when the meter shows 90 ampere-hours are out. Gassing and temperatures above 110 degrees Fahrenheit must be avoided. G. M. Goetting, Boston Edison Company, corroborated the foregoing speakers with particular reference to fairly empty batteries.

Mr. Daggett said that in a recent taxicab test in Philadelphia a service of 60 miles per day was increased to 120 miles by charging the cells when standing for five and ten-minute intervals which did not interfere with the service. W. G. Bee, Edison Storage Battery Company, Orange, N. J., called attention to the keeping of storage-battery street cars running 18 hours per day at Washington, D. C., by four to six-minute charges at the ends of certain trips. Other speakers were A. J. Marshall, E. Y. Stimson and Albert Weatherby.

Recognition of the Electric.

A paper by Hayden Eames, Standard Electric Company, Cleveland, O., was read in the author's absence by C. H. Miles, Boston. The writer pointed out that there is no romance in electric-car operation, and that the public needs to be educated as to its practical service. The man who buys a gasoline car for $2,000 does not realize that the electric machine can be run at one-third less per mile. Broader methods of advertising, and particularly the encouragement of word-of-mouth recommendations from owners to prospects are needed. Nothing will advance the cause more than practical applications of electric vehicles and testimony by their users as to their convenience and economy.

Competition, Fair and Unfair.

A. Vere Shaw, of the Peerless Motor Car Company, Boston, opened the final session at the Engineer's Club on Wednesday morning with a paper on competition, J. A. Hunnewell, of the Lowell Electric Light Corporation, presiding. He outlined the evils of the economic system which tempts men to acts of business immortality and sets his face strongly against the boomerang policy of "knocking" competitors. Confidence is the mainspring of modern business and the buyer has a right to the truth. Distrust in a battery, created by an unscrupulous salesman, injures the entire battery business. All competition should be limited to offering society either a better article or a lower price. In place

Books on Electric Vehicles

Textbook on Motor Car Engineering

By A. G. CLARK.

To be complete in two volumes. Vol I., Construction. 213 illustrations. 6x8¾. Cloth. 457 pp. Price, $3.00.

Contents: General Principles and Construction of the Petrol Engine; Details of Engine Construction; Petrol and Other Fuels; Carbureters and Carburation; Thermodynamics of the Petrol Engine; Horse Power; Mechanical, Thermal and Combustion Efficiencies; Principles and Construction of Coil and Accumulator Ignition; Magneto Ignition; Engine Control and Cooling Systems; Crank Effort Diagrams; Clutches and Brakes; Gears, Lubricants, Lubrication Ball and Roller Bearings; Chassis Construction; General Principles of the Steam Car; Steam Engines and Condensers; Steam Generators and Pipe Diagrams; The Electric Car; Materials Used in Motor Car Construction; Examination Papers; Physical Properties of Petrol; Mathematical Tables and Constants.

The Automobile Hand-Book

By L. ELLIOTT BROOKES, Assisted by Other Well-Known Experts

Revised and Enlarged 1911 Edition. 16mo, over 650 Pages and over 320 Illustrations. Full Leather Limp, Round Corners, Red Edges. Price $2.00.

The automobile hand book is a work of practical information for the use of owners, operators and automobile mechanics, giving full and concise information on all questions relating to the construction, care and operation of gasoline and electric automobiles, including road troubles, motor troubles, carbureter troubles, ignition troubles, battery troubles, clutch troubles, starting troubles. With numerous tables, useful rules and formulas, wiring diagrams and over 320 illustrations.

Power transmission is thoroughly discussed, and the various systems of transmitting the power from the motor to the driving axle are analyzed and compared.

The perusal of this work for a few minutes when troubles occur, will often not only save time, money, and worry, but give greater confidence in the car, with regard to its going qualities on the road, when properly and intelligently cared for.

This is a brand new book from cover to cover—1911 Edition—and must not be confounded with any former editions of this popular work.

PRACTICAL AUTOMOBILE DICTIONARY. By S. KRAUSZ

English-French-German; French-English-German; German-French-English. With an introduction by C. J. Glidden. Twelve thousand technical terms and other words employed in connection with motor cars and motoring. For use in office, factory, repair shop and touring in foreign countries. 16mo. Leather. 129 pp. Price $2.00.

SELF-PROPELLED VEHICLES. By JAMES E. HOMANS

A practical treatise on the theory, construction, operation, care, and management of all forms of automobiles. Seventh Edition, revised. 500 illustrations. 6x9. Cloth. 667 pp. Price $2.00.

The various theories and problems involved in the construction and operation of the prevailing types of motor road carriages have been stated as clearly as possible, in order that the involved situations may be readily comprehended by all readers. The fundamental principles of the several types of motor, particularly of the gasoline engine, which is the least understood of all, have been treated at considerable length, in order that the facts may be thoroughly comprehended in their new relations.

THE AUTOMOBILE. By P. N. HASLUCK

A practical treatise on the construction of modern motor-cars, steam, petrol, electric and petrol-electric. Three volumes. Special Edition, enlarged. 1,360 illustrations. 8vo. Cloth. 1,900 pp. Price $10.00.

A very handsome set of instructive books brought up to date in the third volume containing many elaborate illustrations of cars now in use.

Electrical Review and Western Electrician

Western Headquarters for Electrical Books

608 S. Dearborn St.
CHICAGO

Gould Storage Battery

AN official of a large steel company who has several electric vehicles and has had batteries of other make, wrote to our Chicago representative as follows:

"I want you to get my batteries and fix them up in good shape. I prefer to deal with you again as your batteries have given such excellent satisfaction that I want to continue using them. I will let you know later when I want you to replace the batteries in my other car."

Please remember, too, that the Gould Battery is backed by one of America's strongest manufacturing organizations—one that has had fifteen years' experience in battery work alone.

Our desire to help you is sincere, and careful investigation would soon confirm the logic of our claims of extremely long battery life, high capacity and thorough service satisfaction.

The improvement possible in your car will be explained if you tell us its make, model and the mileage now obtainable. Wouldn't it pay you to investigate?

Gould Battery Renewals fit any battery jars.

Ask at least for our booklet "What Gould Vehicle Batteries Are Doing," or, if interested in power plant batteries only, state your needs and our engineers will gladly give you the needed information or batteries.

Gould Storage Battery Co.

GENERAL OFFICES: 30 E. 42nd ST., NEW YORK CITY
WORKS: DEPEW, NEW YORK

BOSTON: 14-16 Cambria St.
PHILADELPHIA: 613 Betz Bldg.
CLEVELAND: 1761-5 E. 18th St.
DETROIT: 88 E. Congress St.
CHICAGO: The Rookery.
SAN FRANCISCO: 1440 Van Ness Ave.
LOS ANGELES: 110 E. Pico St.

Agents in: Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Louis, Kansas City, Omaha, Denver, Topeka, Seattle.

Canadian Representative: R. E. T. PRINGLE
Toronto Montreal Winnipeg Vancouver

105

of the combination, coercion and secrecy of yesterday should stand the modern policy of service, subdivided into co-operation, competition and publicity.

P. E. Whiting, S. R. Bailey & Company, Boston, cited the improvement in the local electric-vehicle market resulting from the co-operative work of the Electric Motor Car Club of Boston in the past three years. Today there is hardly any "knocking" of competitors in the field. Mr. Mansfield said that older salesmen are much less prone toward tearing down their competitors' reputations, relying upon other and better ways of getting business. Colonel Bailey and Messrs. Marsh, Bee, Abel, and F. J. Stone of the Electric Storage Battery Company, Boston, offered cumulatice testimony along the above line.

Open Business Forum.

Converse D. Marsh, New York, analyzed the electric-vehicle sales problem diagrammatically, starting with the local agency. Business getting by salesmen was divided into the following records: Daily detailed report of prospects calling at salesroom; same on prospects called upon at home or office; demonstrations, reports and suggestions as to closing deal; and detailed reports as to calls on prospects. Advertising was skeletonized under the four heads of newspapers, follow-up literature, outdoor displays, and programs. Under the first were morning and afternoon issues. Under the second came form letters, printed matter and catalogs, with special letters from satisfied customers. The third head embraced billboards, painted and illuminated signs, and the fourth covered theaters, Boston Opera House programs and church and club publications. Mr. Marsh said he greatly doubted the value of advertising in programs of any kind. He dwelt upon the importance of a very large list of prospects, considering the small percentage of immediate customers. He discussed at some length the value of form letters of the highest class, and emphasized the importance of individuality in such compositions, actual signatures in ink, and even an occasional error in spelling (except in Boston!) as an insurance against stereotyped appearance. Of supreme importance is the making of a record of any word dropped by the prospect which throws light upon his point of view and enables the salesman to meet him on the same plane in all future relations.

Mr. Marshall opened the discussion. He said that too many people regard the electric vehicle as a "second" car, to be bought after the gasoline machine. Albert Weatherby, Detroit Electric car representative, Boston, said that he often follows the horse and places the electric vehicle in families, about 65 per cent of whom never owned an automobile. Colonel Bailey said that the easiest sales are made to existing car owners and Mr. Whiting said that about 50 per cent of the Bailey cars are now sold to men. There is room for more general advertising as to what the electric can do. Colonel Bailey said that the prospect rarely knows that the speed of the electric vehicle on the road, speaking from his own close observation, exceeds that of the gasoline car on the average.

Day Baker pointed out that the mechanically minded New Englander, with his heritage of early failures of the electric vehicle about 1901, needed to be educated as to the great improvements in recent products. He said that in running an electric daily between Brookline and Boston he observed an average speed of gasoline cars of about 15 to 17 miles per hour. Answering a question, Mr. Marsh said that if a local agency had $1,000 to expend in advertising in a year, he would recommend spending $250 on two or three press displays and putting the rest into mail and follow-up work. Newspaper advertising pays far better than program advertising because the reader buys the paper, and anything that costs real money means more than a publication which is free. Louis D. Gibbs, superintendent of advertising, Boston Edison Company, agreed emphatically with Mr. Marsh in regard to the uselessness of program displays, which he characterized as a "hold-up."

Weak Links in the Chain of Electric-Vehicle Salesmanship.

In a valuable paper upon this topic, F. Nelson Carle, publicity manager of the General Vehicle Company, Long Island City, N. Y., said that out of 100 average New England firms who look like good prospects at a given date, 8 may be eliminated as to immediate credit, 17 will have a straight gasoline truck proposition, 15 will have one or more gasoline trucks and will try them out before buying additional equipment, 12 will have local operating problems which the horses will best serve, 32 will either own no horses outright or be tied up with teaming or trucking contracts of various kinds, and 16 will be what might be called "gilt-edged" prospects for electric trucks. Of these 16 93.75 per cent will swear that they are not just now ready to buy. Assuming that the salesman converts 7 of these to the electric vehicle, he will lose at least two sales through competition, on price, delivery date or on differences in design. One sale will probably be forfeited because the man higher up changes his mind about buying trucks; another may go by the board because garaging and charging facilities are not immediately available. That leaves three firms to cash in on.

Some of the weak links in electric-truck salesmanship are as follows:

1. Lack of trade knowledge in opening up various lines of business.

2. Lack of more intelligent co-operation between the sales force and the smaller central station, accessory salesman and truck buyer.

3. The disposition on the part of some salesmen to accept an order for what the customer thinks he wants, rather than for what experience indicates he should have.

4. The tendency of some salesmen to let their engineering enthusiasm suggest a type of machine which pleases the customer but which is impractical to build and sell at the regular price.

5. Trade deals and concessions on the part of truck agents who place their commission before the good of the industry.

6. Inattention to really interested prospects in the smaller cities in a given sales territory.

7. Lack of more practical sales helps to the agent on the field by the manufacturer.

The industry must expect a certain amount of "giving in" to the customer for the reason that a man buying his first truck is apt to see everything through horse-wagon glasses. The business is needed, but if an initial truck falls down because of its departure from the standard, re-orders are automatically killed. No electric-truck manufacturer has half as large a sales organization as he would like, and as a result prospects in small places are sometimes unintentionally neglected. This situation works against the general success of the electric, and should be remedied as soon as possible in view of the activity of the gasoline-truck people. One of the first essentials to better results is an endless chain of data interchanging between salesmen in different parts of the country. The manufacturer is at fault in not giving the man on the ground greater assistance along this line, but it takes time and money to establish a clearing house of the kind needed. Some salesmen and agents do not save or assimilate the data sent them, and others "holler" for information but never turn in any to headquarters themselves.

At present, sales of standard machines are of prime importance. Electric trucks need to be made in great numbers to reduce costs and benefit the buyer. When the central station sides with the buyer in demanding special design, or a battery man breaks into the situation and gets the specifications modified, neither are helping to increase sales in the broad sense, because "specials" are fatal to quantity production.